

# COMMERCIAL CAR JOURNAL

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Prices \$625 to \$2800, chassis, F.O.B. Lansing.  
hedral bodies to suit every purpose. New Trac-  
ailer units—1 1/2 to 4-ton tractors with matched  
trailers; gross capacities, 16,000-35,000 lbs.;  
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## The New 1 1/2 ton Speedwagon Now Powered with a Reo-Built Gold Crown Engine!

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means all that science has mastered to give a motor  
long life, speed and enduring power. In a 1 1/2 ton  
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# \$625

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Gold Crown chassis, F.O.B. Lansing

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**PIERCE-ARROW**

*Buffalo, New York*



# COMMERCIAL CAR JOURNAL

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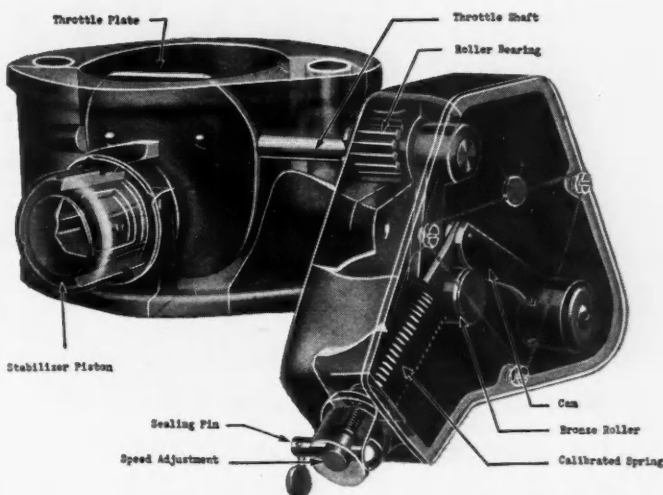
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The Commercial Car Journal

3



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To design a device that will limit motor speed is a simple task. But to make speed regulation ACCURATE, and to provide its protection without loss of power BELOW the desired top speed, is a problem requiring patient, experienced engineering brains and high degree specialization.

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Let no power-stealing device handicap your truck's performance! Equip with a Handy Governor and enjoy accurate speed control as well as FULL power for uphill and other hard pulling under full load!

HANDY GOVERNOR CORPORATION  
Detroit

# HANDY GOVERNOR

June, 1932

# "EXPERIENCE ESSENTIAL"

When you have a big job to be done, you go after an experienced man to do it. An engine does the work of many men. That is why you should say "experience essential" when you buy one.

Continental has produced more than 3,000,000 engines in the past 30 years. They have worked on every conceivable type of job. Continental engineers have watched them and studied them as they

have done the hundred and one things passenger cars, buses, trucks, airplanes and boats are called upon to do; the thousand and one things that fall to the lot of engines in the industrial and agricultural fields.

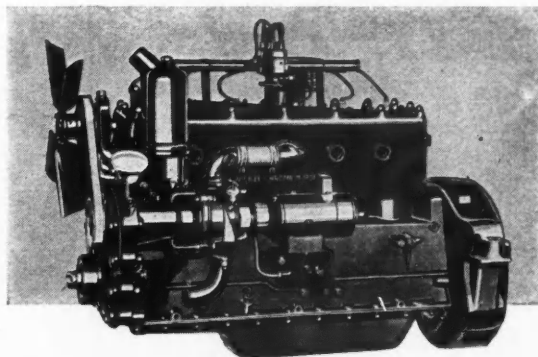
Experience is the fundamental reason for the excellence which characterizes every Continental engine. You can benefit by this thorough knowledge of many jobs in many fields by specifying Continental.

● 22 Brockway trucks powered with Continental motors are in the service of Frank Seeley, Contract Hauler of Norwich, New York. Two of these trucks hauling for the Victory Chain, Inc., operate all day and night every other day and average 250 to 300 miles every day in the week.



● 13 Continental-powered Corbitt trucks are owned by the city of Raleigh, N. C. Eight of these trucks are used in the sanitary department and are equipped with dump bodies. Five are used in the excavating and repairing division. The city of Raleigh has used Continental-powered Corbitt trucks for seventeen years.

● The name "Continental" is synonymous with the word "experience." It guarantees real performance and a dependable, economical source of supply.



# Continental Engines

CONTINENTAL MOTORS CORPORATION • Offices: DETROIT, MICHIGAN • Factories: DETROIT AND MUSKEGON



Truck Buyers of Today, Shrewd Judges of Value, Are Not to Be Fooled With Inflated Prices. Long Discounts Only Serve to Promote Prolonged Chiseling, Cause Dealers to Give Away Their Discounts and Factories to Spend their Profits.

**D**EFLATION has been painful but there is one form of it which the motor truck industry may find beneficial—deflation of list prices, discounts and used truck allowances.

Every truck buyer is, of course, intent upon selling his used truck for the highest possible price. Many fleet buyers and purchasing agents foolishly congratulate themselves for their own shrewdness in proportion to the discounts from list prices which they obtain.

Many sales are made by playing on these very human frailties. It is comparatively easy to establish a list price which provides for a liberal discount to the fleet buyer or a generous trade-in allowance.

If inflation of list prices stopped at that it might be comparatively harmless to the manufacturer and dealer even though expensive to the operator.

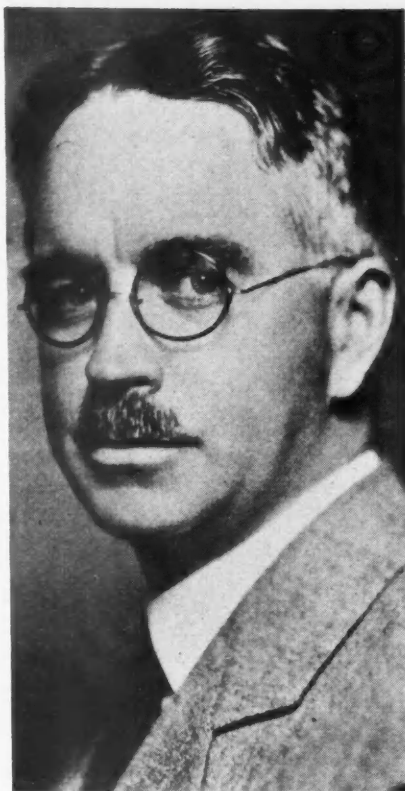
But there are other consequences.

Of course if we have this inflation for the retail purchaser we must not be niggardly with branches, dealers or salesmen. Ample margin for selling expenses (possibly including entertainment) must be included in the list price.

It follows, then, that no one can object if the factory profits are also figured into the price on the basis of large round figures.

With all this taken care of, everybody should be happy.

But, are they?



By

*J. M. Cleary*

PRESIDENT

S.P.A. Truck Corporation

The sad fact is (and it is only natural) that the larger the discount which the buyer receives, the more apt he is to feel that still more may be obtained by prolonged chiseling.

When a used truck is appraised on any basis other than its resale value the buyer becomes insatiable in his demands.

And the larger the dealer discount, the more he doubts that he is getting the maximum.

## COMMERCIAL CAR JOURNAL

PHILADELPHIA

PENNA.

JUNE, 1932

VOL. XLIII, No. 4

The salesman also, knowing that list prices are inflated, feels that every deal should be a special one.

Loose, misleading accounting, high overhead, expensive practices of every kind are encouraged by the attempt to fool the retail customer.

Our corporation sold Studebaker trucks on a basis of low discounts and low factory discounts. Dealers were forced to handle their business, including trade-ins, on a thrifty basis and, as a consequence, they have operated profitably.

At the same time the same dealers were handling our line of Pierce-Arrow trucks on a long discount on top of which we had a substantial (and conventional) factory profit—on paper. Experience has shown us that the dealer gave away his discount and the factory spent its profit.

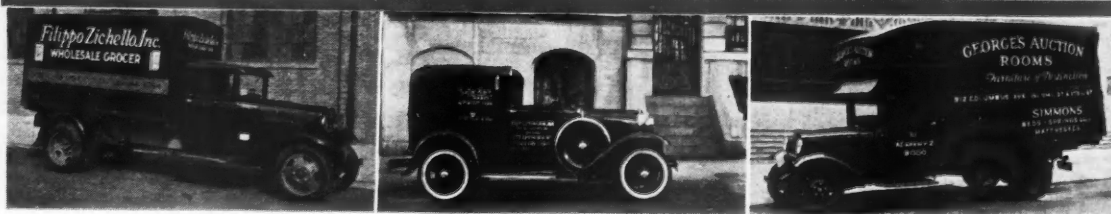
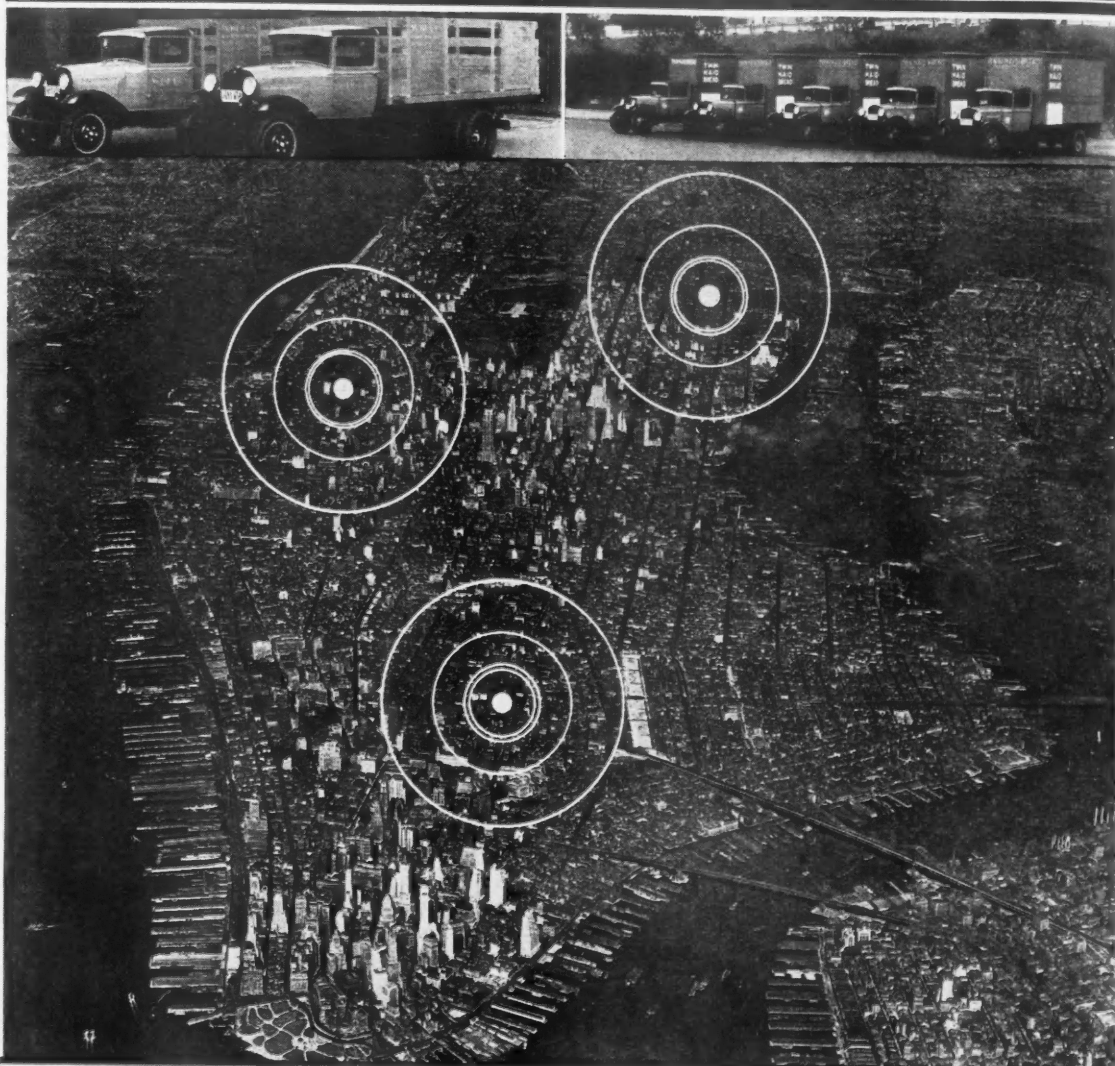
We have accordingly decided to deflate the Pierce-Arrow prices and discounts. Dealers have accepted the new policy and report that it is pleasing to purchasers also.

Possibly deflated prices, fleet owner discounts, trade-in allowances, entertainment, etc., do not fool the customer so much as they fool the manufacturer and dealer. The truck buyer, with the vast amount of comparative specifications made available by the COMMERCIAL CAR JOURNAL, has become a shrewd judge of values, primarily interested in what he gets for his net expenditure.

# THE PRESIDENT'S PAGE

# "I WISH I'D RENTED

Storage facilities are spotted at three strategic points on Manhattan Island. Universal rents all types of trucks from de luxe delivery units to vans. (Aerial view furnished through courtesy of Dallin Aerial Surveys)



**A**NY dealer who doesn't look into the possibilities or engage in the business of renting trucks to users is just plain foolish. My one regret is that I didn't get into the truck rental business years ago."

Horace E. DeLisser, president of DeLisser Motors, Inc., formerly New York City's leading Ford dealer and now representing Dodge-Plymouth,

was a great deal more vehement than those words indicate—and infinitely more expressive. He didn't really say "just plain foolish." In order to give adequate expression to the depth and intensity of his feelings in the matter he reached 'way back into the whip-socket years of this century and came up with a picturesque epithet that brought on homesickness for the good

old days spent hanging around the Locust Mountain Livery Stable.

Every man has a right to his own opinion, and, as Oliver Goldsmith put it, every man has a right to knock him down for it. Mr. DeLisser's opinion is not a hasty one. He has had a year's experience with his Universal Truck Rental Corp., and his opinion is based upon its success. So if there's



# TRUCKS YEARS AGO

any dealer who is inclined to smite him for it, he may change his mind if he can persuade Mr. DeLisser to impart, in dollars and cents, his reason for regretting that he didn't get into the rental business years ago.

But in fairness to Mr. DeLisser, his statement should not be taken as a criticism; it should be taken as a suggestion—a word to the wise. It is indirect advice based upon a profitable experience. His rental set-up is not an organized charity to aid indigent and decrepit business establishments. It nets him a profit two ways—in the sale of trucks by DeLisser Motors, Inc., to Universal Truck Rental Corp., and in the rental of those trucks by Universal.

Mr. DeLisser was encouraged to enter the truck rental business because of his knowledge that in small establishments where truck operation is incidental to the main business trucks usually are treated more or less as an evil. Frequently the owner of the business has only a hazy idea of how much it costs him to operate his one, two, three, four or five trucks. No effort is made at efficient supervision. Maintenance is haphazard. Appearance is neglected. Drivers are disinterested. In short, the operator finds his lap filled with all the evils that result when there is neither willingness nor competence to assume the responsibilities of truck operation. These responsibilities the Universal Truck Rental Corp. is prepared to assume, and at a saving to the operator.

Universal is making no effort to sign up large, well-maintained fleets. These large fleets, in Mr. DeLisser's opinion, already are doing for themselves what Universal aims to do for the smaller operators. "I'm not going after the large fleets," he said, "because in order to get them we'd have to bid our heads off against their own operating figures. And since these are figured on a non-profit basis, we wouldn't stand a chance to make money on the deal. No, our prospect is the small operator who doesn't know anything about truck operation and doesn't care; the operator who is too busy attending to his main business to bother about costs, and who, if he did know his costs, would probably seriously consider going back to a horse and wagon. I, for one, can't blame him for slighting his trucks. His time is valuable to his business, and it wouldn't pay him to have a competent man to handle nothing but the operation of a few trucks. For such an operator we have a distinctly

SAYS



HORACE E. DELISSER,

PRESIDENT

DeLisser Motors, Inc., and  
Universal Truck Rental Corp.

## Details of a Successful Truck Rental Plan Which One New York Dealer Has Sold to Many Truck Users

By GEORGE T. HOOK

economical transportation service."

There is nothing intricate about the physical aspects of the rental set-up and the stipulations of the rental contract are equally simple.

DeLisser Motors, Inc., and Universal Truck Rental Corp. are separate companies operating under the one roof. Mr. DeLisser is president of both. M. G. O'Beirne is vice-president in charge of rental operations. Every salesman in DeLisser Motors may sell a prospect on the rental idea. Primarily the salesmen are out to sell the trucks, but the rental plan is steadily

gaining in popularity. Periodically a rental drive is put on in which all salesmen participate. It gives them a new approach to prospects, and the prospect who isn't interested in the product may be greatly interested in the service.

However, no salesman has authority to make final arrangements. These are handled by Mr. O'Beirne. A survey of the operation is made and a "Truck Rental Estimate" is figured which includes the items listed in the box on page 16. The rental charge takes the form of a flat weekly payment based on the prospect's weekly mileage expectancy. If this mileage is exceeded, the excess mileage is figured extra at so many cents per mile. These charges naturally vary with the type and cost of the equipment rented and the operating conditions. These factors determine rate of depreciation and cost of servicing.

The salesman getting credit for the rental arrangement is credited with the sale of the trucks rented. If two trucks are rented he gets his regular sales commission on both trucks. The deal is a straight fleet discount purchase by Universal from DeLisser. In case a trade-in is involved the appraisal is made by DeLisser Motors. The amount allowed—let us say it is \$250—is credited to the account of the renting operator. Of this about \$150 would be placed on deposit and retained for the life of the agreement as a forfeit in the event of a breach of contract. Against the balance would be applied the weekly charges.

The contract is plainly worded and is a one-page document. It smacks of honesty and fairness. Particulars comprise the following items: "Period of Service. Rate—Per Week per Truck for (stipulated number of) Miles. Rate—Per Mile per Truck in excess of above mileage. Deposit—To be retained until termination of agreement and to be forfeited for any breach of contract. Service to be rendered with the following trucks. Trucks equipped as follows. Trucks painted and lettered as follows."

Conditions of the contract are clearly stipulated, as follows:

1. (Service and Maintenance) Universal Truck Rental Corp. is, in consideration of the above price, to furnish above equipment with complete service including the supplying of gas, oil, repairs, tires and maintenance. Corporation is to pay for all license plates, storage, but not however to supply the driver.

2. (Insurance) Corporation will ef-

fect adequate insurance at its own expense on above trucks which will indemnify the customer for all accident claims in connection with the operation of said equipment as follows:

3. (Spare) Corporation is to provide a spare truck in case of breakdown so that service of corporation will be maintained at all times, such substitute truck to take place of regular truck and to be paid for in lieu of regular truck until same is put back into service.

4. (Repainting) Corporation is to repaint said trucks when necessary and at all times to maintain them in good appearance; any change in lettering or painting, however, to be paid by Customer.

In consideration of the above the Customer agrees to do the following:

5. (Chauffeurs) To replace immediately on Corporation's authorization any and all chauffeurs whom the Customer may hire in connection with the above equipment in the event of the Corporation's showing proof of any abuse of the above equipment.

6. (Payment) To pay all bills promptly as follows:

7. (Personnel) To allow Corporation to convene Customer's chauffeurs at definite times, intervals and places for the purpose of instruction, etc., and to engage them in any competition or contest for the mutual benefit of the contracting parties. (This is a feature which will be dealt with in detail later on in this article.)

8. (Records) To have chauffeurs to fill in the necessary forms in order to assist the Corporation in keeping its records and to sign in and out for each truck each day.

9. (Repairs) Not to make or authorize any repairs or adjustments other than changing tires except on authorization of Corporation which will pay for material or labor incidental to extricating vehicle from any breakdown, tieup or accident upon presentation to Corporation of authentic voucher.

10. (Overload) Not to overload any vehicle operated under this contract beyond — pounds.

11. (Cancellation) Customer reserves the right to cancel this contract at any time after six months have elapsed since service commenced upon 60 days' notice in writing, upon the condition, however, that the Customer will purchase all the above-mentioned trucks and equipment from the Corporation at the Corporation's own cost price less depreciation to date of purchase figured on the basis of 33 1/3 per cent per annum. Minimum inventory value on this truck \$.... (Editor's Note—By stating a minimum inventory value the rental company protects itself. Otherwise in the last month of, say, a three-year contract, the operator could purchase the trucks at a ridiculously low figure.) Corporation also reserves right to cancel contract at any time after six months have elapsed since service commenced upon 60 days' notice in writing.

## Forms Used by Universal Truck Rental Corp.

### TRUCK RENTAL ESTIMATE

Name. Address. Date. Telephone. Description of truck. Cost of chassis, body and special equipment. Miles per week. Total cost.

#### Annual Fixed Charges

Depreciation @ . . years. Insurance: Liability, Property damage, Collision, Fire and Theft. Collision Reserve. 6% Interest on Investment. License. Garage. Administration and Superintendence. Sales Expense. Paint Reserve. Per cent spare truck cost. Extras. Total. Weekly Total.

#### Variable Charges Per Mile

Oil, . . Miles per Gal. @ . . per Gal.  
Gas, . . Miles per Gal. @ . . per Gal.  
Tires \$. . per Set for . . Miles. Repairs.  
Maintenance. Total. Weekly Total.  
Profit. Total Weekly Rental.

### CAR OPERATING RECORD

Car No. Unit Cost. Total Cost. Model  
Body Type. Average Weight and Load.

#### Fixed Expenses

Depreciation. Storage. Interest on Investment. License. Insurance. Off. & Admin. O. H. Supervision. Collision Reserve. Paint Reserve. Total Fixed Charges.

#### Variable Expenses

Additional Depreciation. Gas. Oil. Tire Reserve. Labor. Material and Parts. Body Repairs. Washing. Use of Spare Truck. Battery.

#### Comparative Expenses

Actual Collision Expense. Actual Paint Expenses. Actual Tire Expense.

#### Summary

Rental Income. Add. Earned Income.  
Total Fuel Cost. Miles per Gallon. Fuel Cost per Mile. Tire Cost per Mile.  
Monthly Cost per Mile. Total Operating Cost. Miles Traveled. Average Daily Mileage. Fixed Cost per Mile. Variable Cost per Mile. Total Cost per Mile.  
Net Profit.

### DAILY TRUCK AND GARAGE RECORD

Name. Address. Garage. Date. Truck and Route Number. Speedometer Reading: In, Out. Daily Mileage. Gasoline. Oil. Space in which a driver notes any needed repairs. A note says: "Driver not eligible for monthly bonus—unless this card is properly filled out. Report all accidents."

### MECHANIC'S TIME SHEET

Name. In. Out. Date. Car Number. Time Start. Time Finish. Total Time. Repair Work Maintenance. Stock Material Used. A note says: "Circle car number if work is caused by accident."

12. (Control) Customer shall have entire control of the chauffeur and operation of the truck.

13. (Additional Equipment) In the event that Customer shall desire any additional equipment placed upon the truck, or trucks, other than listed above, then the Customer shall pay for such additional equipment.

14. (Radius) It is understood, unless hereinafter specified, that the radius of operation shall be 50 miles from the storage point.

15. (Gasoline Price) This rate of service is based on the retail price of gasoline at 14 cents per gallon. The parties hereto agree to compensate one another for the difference should the price of gasoline increase or decrease two cents or more per gallon, such adjustment to be based on 10 miles per gallon.

16. This contract shall be binding on the parties hereto, their successors, legal representatives and assigns, and neither party shall have the right to assign this contract or any interest therein without the written mutual consent of each other.

Realizing that the success of a truck rental plan depends to a large extent upon the drivers, Mr. DeLisser and Mr. O'Beirne have carefully worked out two incentive bonus systems which are succeeding in holding down operating costs and in making better drivers of the men. One bonus plan is intended to reduce accidents and the other to hold down fuel costs.

Under the accident plan a driver receives 50 cents the first month he goes without an accident and 50 cents additional for each month thereafter until the accumulation reaches \$5. From then on he receives \$5 each month so long as he does not figure in an accident. However, the moment an accident is recorded against him he has to start all over again and work himself up from the 50 cents. This is the only penalty he suffers, but the desire to attain the \$5 bonus and to continue receiving it not only makes the drivers safety-conscious but leads to unusual behavior. An actual incident illustrates the latter point.

A service man in making his rounds noticed that one truck had a badly dented fender, evidence that the driver had been in some sort of mishap. He made a note of it and on his next round was prepared to repair the damage. The fender, however, showed no sign of a dent. He got in touch with the driver, but the driver insisted that the service man was mistaken, that he certainly had been in an accident, which he had reported, but had not dented a fender or damaged his truck. There was no need to argue the matter further, because it was evident that the driver had had the fender repaired at his own expense rather than suffer a bonus penalty. This was excellent proof that the bonus plan was having the desired psychological effect and naturally nothing was done to discourage it.

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# TRUCK LEGISLATION NOT IN LINE FOR PASSAGE IN 1932

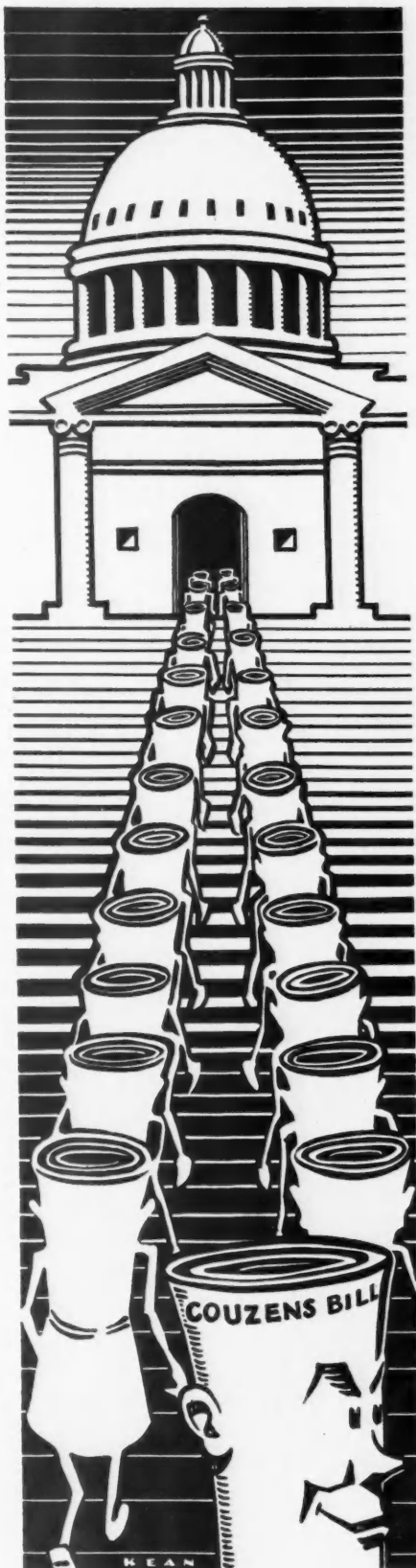
Couzens Bill, Still in Committee, Held Not Important Enough to Further Delay Adjournment for Conventions

TRUCK and bus legislation at the present session of Congress seems to be highly improbable. It is likely, however, that a bill will be reported by the Senate Committee on Interstate Commerce, of which Senator Couzens of Michigan is chairman. The measure will carry his name. It will be partially his handiwork, that of other members of the committee and perhaps greatest of all, that of the Interstate Commerce Commission. Even should the Senate pass the bill, now being slowly redrafted, it would still have to pass the House since the House Committee on Interstate and Foreign Commerce has announced its determination not to take any action until after the measure has passed the Senate.

The fact that Congress is jammed with other legislation and probably will adjourn, rather than recess, before the national conventions in June, indicates clearly how remote the legislation is at the present session.

Infrequent meetings of the Senate Committee are devoted to the framing of a measure which will probably represent a welding together of its own provisions, together with those contained in a bill prepared by the Interstate Commerce Commission. The Commission bill, in turn, is made up partially of revisions of the Couzens bill and a House bill, and is explained at great length in a letter signed by Joseph B. Eastman, chairman of the Legislative Committee of the Commission. It reflects many recommendations made by the commission in its report to the Committee on Rail and Motor Coordination.

It was a question as to what the legislation may lead to ultimately, but as now contemplated it is not of a drastic nature. Especially is this true as to motor truck regulation. The difficulties surrounding truck legislation are recognized and proposals that are in cases of an experimental character are suggested.



By L. W. MOFFETT  
Washington Correspondent

One of the chief things done by the Senate Committee was to lift from the bill the common carrier holding company provision. This had been a bone of serious contention in the committee. The Interstate Commerce Commission also was opposed to inclusion of the provision in the Couzens bill. The upshot is that it was removed from the Couzens measure and drafted as a separate bill for disposition before any action is taken on the bus and truck bill. The holding company provision covers motor carriers only indirectly and as owned by rail lines.

There was serious discussion in the Senate Committee as to whether the provisions for trucks should be eliminated from its bill. Considerable sentiment favored such action, leaving the regulation to cover motor buses only. However, as now contemplated truck regulation will be included, but modified from original plans. The present plan is to limit the truck phase to the requirement of permits for interstate commerce carriers. The rate provision has been left out. It is also proposed to define a private carrier to include trucks. This is a suggested substitution for the term "charter carriers" and it would exempt trucks not on regular interstate schedules. In connection with proposed bus regulation it has been voted by the committee to omit the two-driver proposal and leave to state control the safety provision, covering width, length, height, weight, etc.

The limitation as to permits has greatly minimized objections to regulation of motor trucks. However, the dangerous principle involved in the possible collection of a fee for permits to build up a large fund for an extensive regulatory government bureau may yet project itself in the legislation at some later period. Minority views favoring this plan have been expressed by members of the Interstate Commerce Commission. The bus provisions probably will remain unchanged in their more important aspects. Proposed truck legislation constitutes the greatest problem. Difficulty of enforcing truck regulation is widely acknowledged. There is much contro-

TURN TO PAGE 20, PLEASE

# DO DIESELS HAVE A CHANCE AGAINST GASOLINE ENGINES?

**S**AVINGS amounting to 50 per cent or more in fuel cost is the alluring promise offered by the Diesel engine for automotive applications. There are other advantages, to be sure, which have placed the Diesel in a favorable position for aircraft, marine and general industrial uses.

But what are its immediate prospects in the truck field—the sphere of greatest production-volume possibilities?

Consideration of the positive fuel economy of the Diesel can bring only a high regard for the practical possibilities which development of this type of engine opens up. To begin with, the perfect Diesel cycle is superior to the gasoline type in thermal efficiency, can burn fuel more economically and efficiently, and consequently can produce a given output with less fuel.

Actually, it should achieve a fuel economy of about 0.35 lb. per b.h.p. hr. as compared with 0.65 lb. per b.h.p. hr. for the gasoline engine. How far this may be realized in practice depends upon improvements in design.

But the greatest economy comes from the fact that the Diesel has practically a flat fuel consumption curve. It is almost as efficient at part load as at full load, whereas the efficiency of the gasoline engine falls off very rapidly at decreasing load. Now, since most highway transportation service is on part load, the operating economy takes another jump.

Still another significant saving in favor of the Diesels, assuming the use of present commercial fuel oils, is that the fuel is heavier, weighs more per gallon, and has a corresponding higher heat value. If we compare a furnace oil with gasoline, we find that a gallon of furnace oil has about 12 per cent more heating value in B.t.u.'s; crude oil is still better in this respect.

Combining the ideal economies possible, we find the possibility of achieving a saving of 35 to 60 per cent in fuel consumption (by volume) depending upon the load factor.

Commercial fuel oil, already widely distributed, is the most economical fuel for Diesels. At present, however, this fuel costs only about three cents less per gallon than gasoline in bulk.

Far from running automotive Diesels on crude oil as it comes from



They Have an Edge on Fuel Economy But What About Future Fuel Costs and Taxes?

By JOSEPH GESCHELIN

the ground, as some people believe, current design demands, and trends indicate, that the finally preferred Diesel fuel may turn out to be a highly refined oil, perhaps processed as much as is our present gasoline.

Many Diesels are being run on a commercial grade of fuel oil with a flash point of 150 deg. Fahr. It is a little heavier than kerosene and only slightly less refined because color and sulphur content are not so important. But most makes of high-speed Diesels are placing additional restrictions on fuel specifications. Perhaps the fewest restrictions are found in the recommended specifications for the Buda M.A.N.

Published material indicates that designers of high-speed automotive Diesels are looking to special fuels for the solution of many troublesome problems presented by engines designed to run at speeds exceeding 2500 r.p.m. Minute particles of fuel must be metered accurately within the briefest possible interval. For automotive purposes fuel is injected ahead of top dead center, with the result that volatile elements must be held down to avoid preignition and at the same time the heavier components must be held down to avoid detonation. Thus it can be seen that the preferred automotive Diesel fuel for the future is likely to be a highly refined product.

Incidentally, the special Diesel fuels demand a narrower distillation range than the finest gasolines on the market, and undoubtedly would cost considerably more even if used in reasonable quantities. An effort to create a standardized program on Diesel fuels has resulted in an American Society of Testing Materials Committee, with

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# FLEET MAN PLOTS MERITS OF TRUCKS BEFORE BUYING

Evaluates Performance and Chassis Units According to Work Truck Has to Deliver

By BILLIE BURGAN

Hage's Ice Cream Co., San Diego

INTELLIGENT truck buying requires more than just a consideration of truck ratings and price. When a manufacturer says that a certain model is a 2-ton truck he tells only part of the story. That isn't sufficient, in our opinion, to enable an operator to properly fit a truck to his particular job nor to assure him that he is getting the most for his money.

For that reason, we have found it necessary to devise our own system of rating and classifying trucks as a guide in the purchase of new equipment. The system isn't complicated and only involves three simple steps:

- (1) Consideration of the work to be performed by the truck.
- (2) Segregation of all makes of trucks that will meet the weight and space requirements of that work.
- (3) Selection from that group the truck that gives the greatest value (performance, adaptability and design) for money invested.

Our first step in following through this program is to determine the correct payload capacity and proper frame dimension of the truck in relation to the job it is required to perform. We arrive at these conclusions by measuring and weighing the payload; then we double the payload weight to determine the maximum gross weight; next we measure and weigh the body and finally subtract the body weight from the payload to find the chassis weight. After this information is plotted graphically (see Fig. 1) we proceed to the next step of our system. Truck specifications are consulted and all chassis, irrespective of make, that meet our gross weight and chassis weight requirements and possess the proper frame dimensions back of cab to seat



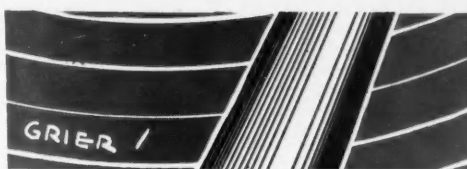
necessary to our needs are picked out for further study.

With the weight and size factors established by the first two steps of our program, we are ready to enter into the third and final stage of the system. Our doors are thrown open to the representatives of all the trucks we have segregated as meeting our weight and size requirements. These representatives are given an opportunity to tell their story and demonstrate in any manner they choose except by the free-haul act.

During this preliminary examination, which lasts two or three days, we place the trucks alongside of each other; ride in them; look them over carefully and jot down feature advantages and differences for later reference. Then our president, who also has viewed the display, together with the financial secretary, makes a study of price quotations in relation to the amount of capital allotted for the job to be filled and designates three of the trucks as suitable. He then orders a comparative setup of major units and features of performance of all three jobs (see Fig. 2). This sheet is drawn up for the purpose of scoring.

Then a council of four, composed of the president, financial secretary, delivery manager and head mechanic, is called. At this session points of difference and feature advantages are discussed from information gleaned during the preliminary examination. As each point on the comparative sheet is decided, scores of first, second or third place are awarded according to majority opinion. These estimated values to us are ratings in the abstract. We try to eliminate favoritism and pick jobs suitable to our needs and having progress built into them according to the judgment of all connected with the purchase. The result of the conference is automatically expressed in the totals of credits. The truck with the highest score secures the order, but the name of the winning truck is withheld until proper terms for a deal are arranged. With us it is generally cash. Trade values, if any, and trade discounts are settled before awarding the contract. The record of a truck stands, the management feeling that there is no need of a second examination of the same truck if another truck is needed.

Sounds like a parlor game, four at a table with dealer dealing a hand for



# Reproduction of an Evaluation Chart that Selected a Truck

Subject Considered	Mack B. G.	Credit	White 61	Credit	Autocar A	Credit
1 Wheelbase.....	138-192	-	148-196	-	150-192	-
2 Gross Weight.....	13,000 lb.	1	11,500 lb.	3	12,000 lb.	2
3 Chassis Weight.....	5,200 lb.	3	4,789 lb.	1	5,060 lb.	2
4 Piston Displacement.....	309 in.	2	299 in.	3	358 in.	1
5 Rated H.P.....	31.5	3	33.7	2	38.4	1
6 Brake H.P.....	75 @ 2600 R.P.M.	2	61 @ 2100 R.P.M.	3	82 @ 2400 R.P.M.	1
7 Piston Material.....	Aluminum	3	Stl.	2	Cast.	1
8 Diameter Main Brgs.....	2 3/4 in.	2	2 3/4 in.	2	3 in.	1
9 Length Main Bearings.....	10 31/22 in.	2	9 1/4 in.	3	13 1/4 in.	1
10 Location of Hand Brake.....	Left of Driver	2	Left of Driver	2	Right of Driver	1
11 Area of Service Brake.....	354 in.	2	211 in.	3	400 in.	1
12 Steering Gear.....	Own	2	Han.	1	Ros.	3
13 Final Drive—Type.....	Single Full.	1	Single Semi.	2	Single Full.	1
14 Cab Hinging.....	Top to Bottom.	-	Top to Bottom.	-	4-Hinge Door	-
15 Cab Suspension.....	Four Point.	2	Three Point.	1	Three Point.	1
16 Frame Width.....	33 1/4 in.	2	34 1/4 in.	3	34 in.	1
17 Cylinder Pattern.....	Integral with C. C.	2	Separate Block.	1	Separate Block.	1
18 Spring Suspension.....	In Rubber	1	Shackle Bolts.	2	Shackle Bolts.	2
19 Clutch.....	Disc. Own Make.	2	Plate Own Make.	1	Plate Long.	2
20 Crankshaft Finish.....	Case Hardened.	1	Soft Ground.	2	Soft Ground.	2
21 Timing.....	Case Hardened Gears	1	Chain.	3	Gears.	2
22 Step Brake Sts.....	Covers.	1			Brace.	1
23 Dust Covers.....						
Totals.....	1sts.....	6	1sts.....	5	1sts.....	13
	2nds.....	11	2nds.....	7	2nds.....	6
	3rds.....	3	3rds.....	7	3rds.....	1

Decided on 12-26-30

Subject rated is where difference is noted on these three models.

All have unit powerplant, Spicer joints, S.A.E. threads, 7 main bearings, Handy governors, standard gear shift, four-wheel brakes.

Dealt closed 12-31-31.

Fictitious names were not employed to designate the truck makes in this comparison because the tabulation represents one concern's method of evaluation. Characteristics of items compared and the standard employed to evaluate them will vary with concerns or individuals

a truck dealer. But let me say, every job chosen by this system has delivered and is delivering satisfaction, which is more than we can boast for some of our other jobs.

The following extracts taken direct from the minutes of a council session give an idea of the nature and scope of our discussions before scoring decisions are made:

## Route Truck Decision

President: "How about this emergency brake hand lever location?"

Mechanic: "To have the lever to the left of the driver is to depart from lever location on our standard jobs."

Delivery Manager: "A guard against mistakes would be to have all trucks in our fleet with hand brake in the same location, principally on account of the relief driver going from one truck to another."

Secretary: "A good safety measure in favor of the right-hand brake lever."

The president voted with majority and scored "First" for two of the trucks and "Second" for the other.

## Milk Truck Decision

President: "Is there any particular advantage in one type of final drive over another?"

Delivery Manager: "If an axle breaks, you either tow the job in or take the shop out to the job if it is a semi-floating outfit. When it is a full-floating type you take an axle with you, put it in a few minutes and drive on."

Mechanic: "Full-floating types are more accessible and easier to service with brakes, etc."

Secretary: "Operating expense seems in favor of the full-floating axle; other things being equal, full-floating is my choice."

President voted with majority scoring "First" for truck having full-floating axle.

## Points in all Jobs

President: "There being no objection, scores of first, second and third will be given trucks according to brake surface area."

President: "How about the kind of brake application?"

(Hydraulic got first, mechanical with rods second, mechanical with cables third.)

Oil circulation was discussed and full-force feed drew first, force and splash second, and splash third. Piston displacement was listed first, second and third in order of amount.

## Miscellaneous Points

Three-point cab suspension was given first, and four-point second, while the three and four-hinge cab doors were given preference over full-length hinges because of ease of demounting for summer service though no score was counted. Under the heading of frame cross-member from step to step, a frame stress absorber was counted one point.

Brake dust covers were considered worthy of a point. Vibration was counted against a job, while smooth running was given a point.

## Ratings

In our council discussions we have established standards to guide us in evaluating trucks, of which the following are examples:

**Salesmen**—We give ear to truck salesmen, all of them; it is a habit with us. We regard them as pollen-bearing bees and we must get what they have in order to get fertile ideas in the business of buying progress in a truck.

**Commercial Car Journal**—Lines drawn across the specifications page of COMMERCIAL CAR JOURNAL beneath truck models being considered make comparison a simple matter.

**Factory Claims**—We consider only factory maximum ratings because, like advanced spark, they represent highest efficiency in operation.

**Price Class**—What advantage can

there be in considering tonnage ratings without also considering value for the money? We say "none," that is why we refuse to consider trucks too far out of line on prices.

**Ratios**—True ratings begin after the body is on the chassis. With extra heavy body payload rating is less than with a light body. The dividing line between body and load is clear. One per cent off the body, added to the load or vice versa, changes ratio 2 per cent without affecting the gross.

**Competition**—To us minimum ratings mean that the makers want to compete in a lower capacity field and they cannot be hated for putting them there (confusing though they be); because a deal comes through that channel by pull or preference now and then. Anyway a good truck deserves an easy job once in a while.

**Factory and Dealer**—Maximum rating of factory and/or dealer means reasonable results under reasonable conditions; assurance of satisfactory service and cooperation.

## Truck Legislation Will Not Be In Line for Passage in 1932

CONTINUED FROM PAGE 17

versy for and against strict regulation. Those opposed to too much intrusion in the field fear that restriction of transportation competition would be wholly undesirable. They also point to the fact that the truck is offering farmers and other shippers a service that is not available from other forms of transportation. Many shippers opposed to truck regulation likewise contend that it would inevitably mean higher rates.

Railroads, on the other hand, are urging for regulation of trucks which, they charge, at present, represent "uncontrolled competition." There are some shippers also who profess to speak in behalf of maintaining "long-term interest of a rounded-out transportation system" and fear that even truck owners may not make money out of operations unless regulated.

Taking up some of the more important changes made by the Senate Committee, it substituted the term "private carrier" for "charter carrier" because it was pointed out that it is possible for a charter carrier to be a common carrier, although this is rarely the situation.

It was also at the suggestion of the I.C.C. that the Senate Committee eliminated provisions which made it the duty of the commission to establish reasonable requirements with respect to "qualifications and maximum of hours of service of employees, safety of operations and equipment." The commission pointed out that such requirements are an exercise of police powers for protection of public safety and convenience in the use of the public highways. It was added that the Supreme Court has held that in the absence of Federal legislation upon

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## Our Own Ear to the Ground Department

### Dese, Dose and Diesels

Diesel activity is gaining momentum. A stimulating factor is the trend of legislation.

### Money Being Spent

This department does not know of a single engine manufacturer who isn't working on Diesels. For some time now, for instance, Continental has had an engineer devoting his time exclusively to Diesels. Sterling sent an engineer to Europe to investigate Diesel accomplishments on the Continent and in the British Isles. He came back with a voluminous report, and you may rest assured this expense wasn't incurred for the fun of the thing.

### A Short Time Ago

The Buda Co. possessed itself of the M.A.N. Diesel manufacturing rights several years ago. Shortly after this acquisition we went through the Buda plant and saw automotive Diesels on test stands being put through their paces. But at that time interest was centered on improvements in the Buda gasoline engines, which resulted in the Hivelo series.

### And Now Look at It

Interest evidently has been revived, at least we gather as much from the memorandum of a member of the intelligence staff of this department. He writes: "Although I had heard from various sources that The Buda Co. was not doing much with the M.A.N. automotive Diesel, I found considerable experimental work going on when I went through their plant. They are working on a new model and are experimenting on all sizes with Bosch injection."

### Nothing Is Overlooked

Truck manufacturers, while not feverishly active, have not been lacking in interest. International Harvester has, of course, had a Diesel for its farm tractors. Use of this, or a variation of it, in International trucks has not been overlooked. Experiments have been in progress for months.

### The Colonel Isn't Vegetating

What is General Motors truck doing? Well, Colonel Green, engineering chief and now also in charge of production activities, took the time and trouble and went to the expense of making the most exhaustive test of a European Diesel that has been made in this country. The results which he reported to an S.A.E. gathering were not flattering to the Diesel but he made no assertion which would indicate that because of his findings General Motors had abandoned further experimentation. In fact he made the statement to an operative of our staff that "automotive Diesel engineers are overlooking a bet in two-cycle construction. It would give greatly increased power output." Moreover no outsider knows how much Col. Green learned from his tests which may result in improvements to overcome the objections he found.

### "Number 5" Reports

The activities of a truck manufacturing concern of great repute were reported just the other day by Ear-to-Grounder No. 5. (Really, we're not spoofing when we say we've a staff of operatives.) No. 5 actually drove around in this heavy-duty truck of, as he put it, "well-known make, powered by a four-cylinder 5 x 7 Oberhaensli Diesel, operating at a governed speed of 1800, and carrying a useful load of 7 tons." No. 5 reported further:

### Exhaust Is Clear

"The performance of the truck was indeed striking. General performance on characteristics such as acceleration, top speed and tractive ability was about the same as would be expected of a gasoline

engine truck of this type, but the truck would start from a dead stop in second gear every time. It starts easily from cold when cranked by a 24-volt starting motor. The exhaust was clear under all conditions.

### 10 Miles Per Gallon

"The engine runs on ordinary furnace oil and is said to do 10 miles to the gallon!

### Knocks When Cold

"One of the most important features of the engine is the governor control of recent design. It governs both the top speed and the idling speed. Starting requires advanced injection which is achieved by cutting out the governor by a dash control which simultaneously alters the point of injection. When starting cold the engine knocks noticeably. This persists until the engine is warm and disappears when switched to governor control. It is claimed that an engine of smaller bore will be quieter during the warming-up period.

### Licensing Proposed

"As I understand it, the Oberhaensli company does not plan to sell engines in the United States but to issue licenses to gasoline engine builders for the use of the patented divided combustion chamber and governor control. Stock gasoline engines of sufficiently heavy design can be readily converted to Diesels merely by applying the interchangeable attachments.

### Converting to Diesel

"Such an alteration for test purposes is now under way by the maker of the truck used in the experiment. A standard six-cylinder truck engine is being built up as a Diesel, the changes consisting of the use of an Oberhaensli type cylinder head and a Bosch fuel pump in place of ignition system and carburetor. This six-cylinder engine has a smaller bore than a four of equal displacement, which is an advantage, as pointed out above. It is claimed that this converted engine will develop just as much power as the standard gasoline engine."

### Anyway, It's German

So ends the report and this month's earful. Our parting bit of inside information is that Oberhaensli is pronounced "Oberhaensli." See you consequently.

## THE OVERLOAD

### Are They Readin'? They Arel

At least we're piling up some evidence that this page is being read. Since we last overloaded, Robert F. Wood, Autocar advertising manager, wrote us intimating that we must have been listening to the bartender when he (Mr. Wood) was giving us the inside on The Major. Then Ed Wood, of the Pacific Gas & Electric Co., who is a Major in the Reserve Corps, complained he had been pestered by telephone callers asking him "since when have you taken to literary work?" "What do you mean?" I asked the first caller. (Ed Wood writing.) "Well, aren't you the Major Wood writing for the Autocar Messenger?" To which our own expressive reply was "Whatthell, Ed, whatthell!"

### Pre-War Stuff, At That

Then Tom Barry, of the New York Merchant Truckmen's Bureau, sent us an extremely polite communication. Reading between the lines we got this: "Don't be so free with your suggestions that truck manufacturers take advantage of the New York Beer Parade to exploit beer-toting equipment. The truck division of this Porter Procession is strictly a Bureau proposition. Sailors and Manufacturers keep out." But Tom held no hard feelings. After the parade he sent us photographs of the heavy brigade, and we had to decline them because in some fashion a squad of Big-Brute Macks got in front of the camera and obscured the other 239 trucks in the parade. After all, we can get pictures of Macks by the dozen. But eight Macks don't make a Beer Parade for us.

### Introducing "Mr. H."

Then the "Mysterious Mr. H." answered our request that he divest him-

self of anonymity. His lengthy letter was pleasant, and we have not yet had opportunity to reply to it. He subscribed himself H. L. Thorne, of St. John, New Brunswick. He was with Ford for 10 years in the maritime provinces, first as district sales manager and later head of the commercial division. Now he is manager of the General Equipment Co., of St. John, Diamond T distributor.

### Pullman Cars and Race Horses

And finally G. A. Dougherty, advertising manager of Shuler Axle Co., wrote saying that he, too, has been curious to know the workings of the minds responsible for Pullman car names and the names of race horses. But the designation of axles with model numbers, he said, is another matter. "Every model number is a record of a long line of improvements reaching back for about 14 years." Although the process illustrated by Mr. Dougherty is logical it is also curious and for that reason you may wish to familiarize yourself with it. Here is the history of Shuler front axle No. 5582-B-26 mentioned last month:

### Making Axle History

"Base model number, 510. Increased capacity. Four changes—add '40,' 550. Improved design. Same capacity—adding prefix '5,' 5550. Same capacity axle designed for buses, add suffix (Ed.—This will fix those readers who don't know their suffixes and prefixes.) 'B,' 5550-B. Improved design. One change—add '10,' 5560-B. Above model numbers cover axles without brakes. When brakes are furnished the continuity is as follows: Brakes furnished, Shuler type—add '20,' 5580-B; Bendix type—add '21,' 5581-B; hydraulic type—add '22,' 5582-B; Westinghouse Air—add '23,' 5583-B. Hence a 5000 lb. capacity axle for bus or low-type truck use equipped with hydraulic brakes is known as Model 5582-B."

### Every Maker Gets a Number

And Mr. Dougherty takes care of the added 26 in this way: The first customer specifying this type of axle was furnished with Model 5582-B-1, the second customer with Model 5582-B-2, and so on. So that the Model 5582-B-26 mentioned in CCJ was the twenty-sixth specification of this model and was furnished to Indiana Motors Corp. So there you are.

### Big Bill Bows In

Bill Sutherland, secretary of the Pennsylvania Motor Truck Association, drew up a chair one afternoon and allowed us how he thought the May issue was a pippin. We knew the reason before he told us—the regulation controversy, of course. He should like this issue even more because the legislative subjects are more diversified.

### Maybe in July—Maybe

The description of the National Trucks Associated truck model which we promised in the adjoining department last month failed to materialize. Of course, we qualified our promise by saying it depended on Deane Chivington, secretary of the organization, and he failed us. A few details remain to be adjusted yet, he wrote.

### He Feels His Way In

Charles Wondries, vice-president in charge of sales, S.P.A. Truck Corp., carried a costly calling card the last time we saw him. It was a feeler gage with his name stamped on it. It's the only useful calling card we've seen since bootleggers stopped handing out samples.

### Keystone State Kuts Loose

A memorandum just reminded us that Bill Sutherland said the Pennsylvania method of licensing trucks is being revamped into something entirely different. Get your lobby to working.

### And We Hope Dick Does, Too

And Dick Armstrong, of the Motor Vehicle Conference Committee, has promised us a revision of our size and weight restriction table for early publication.—G. T. H.



Last month Commercial Car Journal published an engineer's conception of what the future truck would be like. B. B. Bachman of Autocar was the engineer. Besides using his knowledge of operating requirements in visualizing changes just ahead he turned his imagination loose in picturing interesting possibilities in the more distant future.

For this issue a fleet operator, Frank A. Rose, was asked to do a bit of future peering. Readers will find his observations intensely interesting because he constructs his ideal 1935 truck from a wealth of operating experience.



WHEN the editor of COMMERCIAL CAR JOURNAL asked me to give an operator's idea of what motor trucks should be like in 1935 I immediately began to think of highways, legislation, present knowledge of chassis improvements and the many trends of thought in design of chassis components. They are landmarks to reasonable conclusions.

Highways today are speedways where main traffic travels at 45 m.p.h., but other traffic travels at the low rate of 25 m.p.h. On highways carrying mixed traffic, especially when they are narrow and have many dips and turns, trucks need a top speed of 60 m.p.h. and increased accelerating ability. This means 20 per cent greater engine capacity than presently provided and compression ratios will approach 8 to 1.

I believe that real streamlining with particular attention to the section below the belt line will be greatly in evidence three years from now; that ultra balloon tires for certain classes of trucks will be common, that power control of such units as clutch, transmission and brakes will be accomplished by the same agency whether it be vacuum, air or electricity; that indicators mounted in the cab to reveal hard riding conditions, flat tires on trailers or broken springs are quite possible. In addition many decided advancements will be made in most of the chassis parts from the engine back and the frame up.

Legislation can easily become a factor in future design, although I don't expect anything radical from this angle except that some states might pass laws eliminating all four-wheel trailer work, save special equipment not regularly employed on the road. This would then leave the field to trucks and semi-trailers. But some minor alterations in width restrictions would go a long way toward compensating for this loss by extending maximum width from 96 to 108 in. This with a 34-in. frame width would permit all equipment to be changed over to balloon tires as large as 10.50 duals with spring widths 5 in. Legislation also is stimulating engineering ingenuity in the matter of weight re-



GRIER

duction and better lighting and will undoubtedly result in the development of light weight alloys for frames and major parts and use of greater candlepower lighting, better reflection and focusing.

To get a pretty good idea of what the 1935 truck will look like, let's start with the engine.

#### Engines

Engines of the future, of 20 per cent more capacity, will have 1000

cu. in. displacement for top limit with drops in steps of 100 cu. in. with no high-speed engines until displacements get down to 600 cu. in. Diesels will be used only for heavy-duty constant speed units similar to present gas-electric type units and probably with modified fuel and in higher priced trucks.

Engine position will be changed. In the first place engines will be placed higher, facilitating valve servicing. Center of gravity will take on

# AN OPERATOR EYES THE FUTURE TRUCK

West Coast Fleet Man Foresees Engines of 20 Per Cent Greater Capacity, Advanced Streamlining, Increased Use of Light Alloys, Ultra-Balloon Tires, Power-Operated Clutches and Transmissions and Electric Brakes

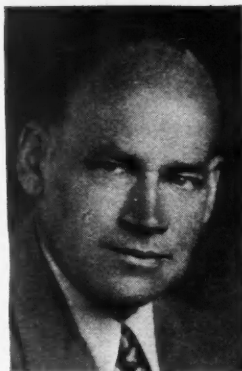
less importance because a tendency toward use of light alloys in engine as well as other major chassis parts is on the increase. Or it is quite possible that valves may be made accessible by lowering fender and frame positions through use of doughnut tires and independent wheel springing. Furthermore, I see no reason why cabs can't be mounted in such a way that there would be room to remove the entire power plant within an hour.

Alloys will play an important part in future engine design bringing lighter weight and longer life. Wherever possible light castings of this material will replace iron or steel in blocks, rods, crankcases, etc.

Valve mechanisms and cooling are in line for advanced engineering. With lightweight blocks will come widespread use of valve seats of Elkonite and Stellite. As for cooling, the immediate future will see increasing use of copper-cored valves, but as we slide into 1933 and '34 when blocks will be redesigned with greater and more uniform water passages around cylinders and ports, use of lighter, larger diameter, thin-walled, salt-cooked valves will become more prominent. I expect to see water jackets brought down lower along cylinder walls. I have seen numbers of cases of distortion through uneven cooling directly traceable to short cooling spaces. As intervals between valve grinds are becoming longer, better cylinder head studs made, perhaps, of stainless steel, will be used to offset effects of corrosion.

With higher ratios of the order of 8 to 1 will also come thicker piston heads and more rings to aid in carrying heat away. And a spark plug thermocouple will be utilized instead of, or as an aid to, coolant temperature indicators.

We shall have to go back to shrouded fans, and offset blades may



By FRANK A. ROSE  
Fleet Operator

## Only Three Years Away:

Engines will have 20 per cent more capacity; displacements will reach 1000 cu. in. and drop in steps of 100; compression ratios will approach 8 to 1, and Diesels, if used, will only be seen in heavy-duty service.

Streamlining, with special emphasis to the section below the belt line, will be greatly in evidence.

Alloys will play an important part in future engine and chassis design, bringing lighter weight and longer life.

Clutch, transmission and brakes will be operated by air, vacuum or electricity.

Instruments mounted in the cab will reveal hard riding conditions, flat tires, broken springs, etc. Magnetic drive speedometers are in prospect.

Valve mechanism and cooling will receive lots of attention, greatly improving efficiency of engine and stretching intervals between valve grinds.

Combination of oil temperature controller with oil filter will improve lubrication.

Generators and starters will be larger, of greater capacity and more efficient. Battery capacities must be increased 100%.

Wiring of the future must be coded and of more adequate size. Increased illumination will require 50-cp. lamps and carefully made and mounted reflectors.

be necessary. As power and speed keep creeping up double fan belts will be necessary to accommodate increased fan power to hold down whip and avoid extra-sized belts. Fan belts should be left free to operate the fan only because the power it is required to transmit is too great to permit operation of additional accessories. Besides, should both fan and pump be driven by the fan belt, road failures of one belt would involve both simultaneously. Finally, as many accessories as possible, including the fan, should be driven from the crankshaft and not the accessory shaft. Timing gear life is too short at present at best and would not be aided by increased demands of generator and pump units. In water pumps, more anti-friction bearings, high grade alloy steel shafts and greater length glands will be necessities from now on.

I believe that an oil temperature controller combined with an oil filter would do more for the truck engine than six years' work on oil. The combination should include a controller, of the Viscon type, together with a large edition of filters of the AC or Handy type. The filter should be large so that large streams of oil can run through at a constant temperature, much hotter than through filters of present size.

In generator and starter design I foresee 50 per cent increase in size, heavier construction and greater use of anti-friction bearings. With development of more rapid operating starters for higher compression engines and constant voltage generators, incorporating possibly double commutators, the effect of battery failure will be apparent only when the engine is at rest. Batteries, the bane of my existence, will have to be of 100 per cent greater capacity. I don't believe that batteries have made five years' progress in the last 20—witness post, strap and cell construction.

Non-friction bearings, formerly used in some ignition units, will again come in, especially in view of the high rotative speeds now encountered. Die-cast zinc or equivalent material should not be permitted for bearing material on the shaft but if possible oil vapor lubrication of the automatic spark advance governor unit should be provided from the crankcase. For eight-cylinder work an eight-lobe cam should

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# JUST HOW MUCH GAFF CAN E. P. LUBRICANTS STAND?



Engineers Determined  
to Find Yardstick for  
Load-Carrying Ability

By NORMAN G. SHIDLE

which do give an indication of the properties of the lubricant, but they can't be relied upon to check with each other; there are considerable variations in the results obtained on the various machines and all the machine results, in turn, often differ from conclusions derived by operation or service tests.

Having found this out through nine months spent in collecting and analyzing data, it is natural that the committee should focus its next major effort on trying to get a yardstick which will accurately evaluate extreme pressure lubricant properties. And it is natural, too, that it should further narrow its immediate objective to trying to gage the particular property of load-carrying capacity, since other properties of these lubricants are of no consequence if the lubricant will not stand the load.

The program, which is being financed by individual contributions from the many organizations interested in the project, will move immediately toward the objective stated in three specific steps:

(1) Measurement of the load-carrying capacity of representative types of extreme pressure lubricants with General Motors, Timken and other machines, following the procedure recommended by the designers.

(2) Correlation of these data with actual service performance.

(3) Development or recommendation of a significant and practical test machine and procedure.

The committee is already convinced that lubricants are available which are more effective in gearsets and bearings at higher loads than those at which ordinary mineral oils are effective; that many gearsets and bearings can operate at higher loads when

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THERE is no satisfactory yardstick to measure the load-carrying capacity of extreme pressure lubricants today. But a program is afoot to find that stick. Load-carrying capacity of E.P. lubricants is about to be studied with an intensity and an accuracy heretofore unknown. The job is going to be done at the Bureau of Standards under the direction of Dr. H. C. Dickinson and under the supervision of the Lubricants Research Subcommittee of the Society of Automotive Engineers.

Until this program has been completed indications of test machines now in use should be considered as directive only and by no means a final criterion of the value of E.P. lubricants.

The first objective will be to develop methods and instruments by which the load-carrying capacity of these extreme pressure lubricants can adequately be measured. General Motors, Timken and others have already developed machines for this purpose,



# SCRAP THE SPECIFICATIONS BUT MAKE SURE OIL'S OILY

Clothes Do Not Make  
the Man Nor Impres-  
sive Statistics the Oil

By K. A. NEWMAN

Manager Lubrication Sales  
E. F. Houghton & Co.

**N**O set of specifications, however inclusive, has ever been able to guarantee the quality of lubricating oils. These specifications refer to the physical characteristics of an oil and not to its lubricating ability. That intangible quality "oiliness" or "lubricating ability" cannot be determined from such specifications. Of course, if the supplier could specify the exact nature of crude from which the oil was to be refined and all of the details of refining, as well as the final specifications of the oil, he might be more nearly sure of the quality of the oil bought on specifications. But then how could he tell whether all of his specifications regarding the source and manufacturing process had been adhered to? Usually a set of specifications is created by analyzing some oil which has been successful on the job.

The physical properties of oil usually referred to are: viscosity, flash point, fire point and cold or pour test. While these factors look fine on a laboratory report, they do not indicate the lubricating value, nor do they insure the satisfactory performance of an oil.

Viscosity of an oil is merely a measure of its resistance to flow. The temperature of an oil has a great influence on its viscosity, and therefore, for purpose of comparison, viscosity readings are usually taken at a temperature of 100 deg. Fahr. (38 deg. C.). However, the size of orifice in a bearing being lubricated and temperature of the bearing seldom agree with the size of orifice and temperature at which the viscosity was taken. Two oils having the same viscosity in a



laboratory test taken at 100 deg. Fahr. may not have anywhere near identical viscosities at the higher temperatures (150 to 300 deg. Fahr.) under which they have to operate.

Viscosity can be measured in various units, namely, Saybolt, Redwood or Engler. However, the standard generally used in this country is Saybolt.

To measure viscosity, a quantity of oil is placed in a cylindrical vessel, which has an opening of given size

and shape. The hole is fitted with a plug or stopper. The vessel is jacketed by water at controlled temperature, which, in turn, controls temperature of oil. If we wish to measure viscosity at 100 deg. Fahr., which is the usual standard temperature for lubricating oils, we place a quantity of oil in the vessel and heat the water until temperature of oil reads 100 deg. When this temperature, maintained constant by automatic control, is

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# WILL MOTOR TRUCKS ROLL AROUND ON MORE RUBBER?



Advantages of Low Pressure  
Balloons Should Win New  
Tires an Early Acceptance

**E**XTRA low pressure tires are singing "They Go Wild, Simply Wild Over Me" to enthusiastic audiences of passenger car owners these days. Recalling the smashing success of the balloon in the passenger car field followed by its hit in the truck industry many observers predict that tire history will repeat itself and that within a year or so big trucks will be floating along on "super-extra balloons."

The new tires do things which compel attention. They run over curbs at speeds to which curbs are not accustomed, skim over washboard roads in utter disregard of corrugations, stick to road surfaces on curves like a locomotive wheel and float over the road instead of on it—if observers with unsullied reputations for veracity may be believed.

So far, extra low pressure tires have been confined to passenger cars and light delivery trucks. They are actually carrying pies and other baked goods in light deliveries, and other similar applications are expected. Interest in the commercial field, therefore, naturally is directed toward the prospects of applying the new type tires to trucks ranging from 1½ tons upward.

Inquiry of tire factory executives, dealers and operators reveals practical

difficulties in the way of developing extra low pressure tires for trucks. These difficulties probably will be overcome but they cannot be disregarded. Furthermore, there is danger in being stampeded into moves which are ill-advised and not properly engineered, as an engineer who was an ardent supporter of the truck balloon during its development points out. He thinks it well to take time to avoid activities which may have to be done over in a more conservative fashion.

The new type tires carry the underlying principle of the balloon tire—infinite elasticity of air—a step, or perhaps two or three steps, further. High pressure tires used on passenger cars before the days of the balloon were inflated to about 20 lb. pressure per inch of width, 70 lb. for a 3½ in. tire, if the owner's kick against the carcass did not err too much in gaging pressure. Passenger car balloons of today carry pressures of the order 32 to 36 lb. per tire (not per inch) and truck balloons carry from 35 lb. to 80 lb., or more. The new tires go down to 16 lb., or so. Outside diameters of extra low pressure tires applied to passenger cars are about the same as conventional balloons, consequently the wheel does a fade-out and the tire is carried on a modified hub.

A strong advocate of the new tires on passenger cars states: "Development of these new tires has not yet reached a point where it has been found practicable to produce them for truck use." Another engineer adds: "These tires (extra low pressure) have only been developed for carrying a 1600 lb. load and it is only the 9.00/16 tire which will carry this load at 24 lb. pressure. \* \* \* The field for this type of tire is limited to very light delivery cars." The quoted carrying capacity of 1600 lb. for one 9.00/16 tire gives a total gross of 6400 lb. for four tires indicating a payload of about 1 ton, but reducing the pressure to 16 lb., which is what the public is talking about, reduces carrying capacity to 1135 lb.

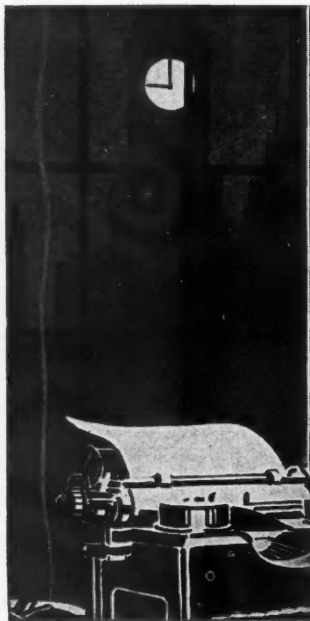
Size of extra low pressure tires for

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# AFTER



# HOURS

## THE TRUCK IS STILL YOUNG

◆NOTHING THE RAILROADS AND THEIR short-sighted allies can do will make the motor truck less potent as a competitive factor in the struggle for short-haul traffic. It is stupid of the railroads to think that if they can bring about higher truck rates the business will flow back into their terminals and cob-webbed freight cars. It would be equally foolish of them to feel cocksure of the prodigal's return even if they were to effect operating economies which would enable them to lower their own freight rates and still make a profit.

In both cases it would be well for the railroads to realize that the motor truck of today does not represent the ultimate in highway transportation operating economy. The motor truck of today is a more economical unit, both as to operation and maintenance, than the motor truck of five years ago. And yet it is admitted that the vehicle of today possesses many opportunities for further development. If by any chance you doubt this we refer you to articles in this and last month's issues. So that the truck of five years hence will be an even more economical unit. And more economical operation will enable the truck to maintain its competitive characteristics.

In order to compete successfully with the motor truck of the future, which is now being evolved as the result of operating experience and engineering progress, railroads not only must effect operating economies themselves but effect them to such an extent that they will counteract all of the competitive advantages of the future truck. This is an accomplishment requiring not only a super sort of management and a super staff of miracle-working inventors but also a superhuman species of anticipation. And since the railroads do not possess these superlatives and are not likely to fall heir to them, it would be wisdom on their part to accept the truck as an instrument that will help them to the profits which now blind their mercenary allies to such an extent that they see the truck only as an enemy.

## EVALUATING A TRUCK

◆NOT CONTENT WITH JUST PRICE AND capacity as determining factors in the selection and purchase of new truck equipment, fleet operators today are beginning to develop a factor of their own—a yardstick to measure the performance and quality of trucks, to help the operator to properly fit a truck to a particular job and to assure him that he is getting his money's worth. Such a yardstick was

evolved by Billie Burgan, a fleet operator of a large ice-cream fleet in San Diego, and is fully described in this issue, page 19.

While the Burgan yardstick, which is a plan designed to evaluate truck characteristics according to established standards, may satisfactorily answer the needs of his organization we are of the opinion that certain additional elements must first be taken into consideration before the plan can be applied generally as an accurate measure of truck performance.

The Burgan plan apparently does not regard the relative importance between major and minor items making up a chassis under examination. All items, small and large, are bulked together and graded exactly on the same basis—first, second and third place. Thus minor items such as spring suspension, dust cover, cab hinging or step brace may counteract the perhaps greater advantages of such major items as horsepower, steering, clutch, brakes, etc. With this set-up, it is quite obvious that a number of first place ratings for minor items might easily place an inferior truck in a high position. The method employed in determining the relative merits of individual items also is not clearly established. In other words by what token is one type of steering gear rated first, another second, or why is a rod-operated brake rated higher than cable, etc.?

However, no matter what the weaknesses of the plan, Mr. Burgan is to be congratulated for a step in the right direction. And we venture the opinion that before many days many similar plans, each benefiting by the shortcomings of its predecessors, will be evolved.

## THE LOWLY LEGISLATORS

◆THERE ARE TIMES WHEN WE WISH heartily that all legislators were laid end to end and kept that way. It would be a great relief to the truck industry in this period when governmental budgets are being balanced and there seems to be unanimous agreement among legislators that the motor truck can carry anything from a heavy load of goods to a heavy load of taxes.

It is doubtless true that the motor truck would fare a great deal better in every state of the Union if legislators were susceptible to an appeal to reason. Unfortunately the run-of-the-mine legislator is not that sort of animal. He is a peculiar creature. In the temple of legislation he and his obedient fellow political puppets are expected to burn the incense that is pleasant in the nostrils of their constituents. And since the longest noses have the greatest area, so to speak, of sensitivity, legislators are particularly careful not to offend them. The longest noses in this sense are the noses that inject themselves emphatically into the consciousness of the legislator. He is made aware of their existence. He follows those noses because they blow votes, and votes are what he deals in.

There is, therefore, nothing new in the observation that in order to attract the consideration it deserves, the truck industry must breed more and longer noses to guide the behavior of legislators. The noses must come from factories, from the trade, from operators, from shippers and from all those friends who see the motor truck and allied equipment as representing an economical and indispensable type of transportation. And if these elements join nostrils the impression upon legislators should be meritorious and unforgettable.

## WHO IS DREAMING NOW?

◆SENATOR COUZENS, SPONSOR OF THE interstate truck regulatory bill which our Washington representative tells us doesn't have a chance of Congressional passage this year, is credited with a statement to the effect that when the depression has

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# Hydraulic-Equipped

Day after day, month after month on the scheduled run—that's the real proving ground for brake performance, and that's where Lockheed Hydraulics have built their reputation as low-cost, high-profit equipment.

So definite, in fact, that many individual owners who first tried Hydraulics on one or more units of their fleet are now completely "Hydraulic-equipped." Quite naturally, the word got around, and bus and truck manufacturers are specifying Lockheeds.

HYDRAULIC BRAKE COMPANY  
DETROIT, MICHIGAN, U.S.A.

## LOCKHEED HYDRAULIC

*Four* **BRAKES** *Wheel*

# PROFITABLE RATES



By G. LLOYD WILSON

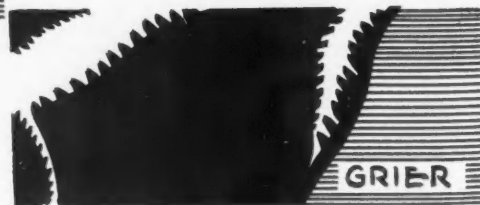
(Traffic Manager and Traffic Consultant  
and now Professor of Commerce and Transportation,  
University of Pennsylvania)

June, 1932

THE question of freight rates is an outstanding problem of motor freight carriers, and one which must be competently handled if motor carriers are to build soundly for the future. Too often motor freight haulage companies lean upon others for the basis of their rates, blindly following the rates made by others in the hope of getting sufficient traffic to operate in the black. Very often, the difference between red figures and black in the profit and loss balances of motor carriers is due to the intelligence with which freight rates are constructed and applied. Fine services fail despite sound operating practices, adequate maintenance, good accounting and proper supervision because rates charged for transportation services are either too high or too low, or because rates upon certain articles or hauls are too high while in other cases they are too low. Proper construction of freight rates is a very important ingredient in the recipe for successful motor freight operation.

Before we turn our attention to ways and means of motor freight rate structures, let us examine the purpose for which motor freight rates are made. Motor carriers are not concerned with construction of a rate structure that is pleasing to the eye by its symmetry and orderliness, but with the hard, practical purpose of constructing freight rates that will serve several very definite needs.

In the first place, the rates charged must produce sufficient revenues to cover the true and complete costs of operation. That sounds like a truism but unfortunately an examination of rate practices of many motor truck operating companies and ex-operating companies indicates clearly that the rates charged by these companies have failed to meet this basic minimum requirement for successful operation, either because true costs of operation are not adequately determined



The Commercial Car Journal



This is the fifth article of  
a series dealing with motor  
freight transportation problems

# ARE TRUCKING LAW

They Must Be Built on the Transportation Commandments of Meeting Expenses, Yielding a Profit and Ability of Traffic to Bear Them



or because operators have chosen deliberately to fly in the face of fate and facts and attempt to meet competition by charging rates below cost of operation. The more freight they haul under such conditions, the deeper they sink into the quicksands of loss until finally and inevitably they are drowned in the bog of red ink. Freight rates then, as a first minimum consideration, must cover adequately the costs of operation and maintenance, including depreciation.

It is not necessary here to analyze in detail the items of operating expense, maintenance and depreciation which must be covered in any adequate system of rate construction. It is sufficient here to emphasize the point that the rates must be adequate to cover:

- Wages and salaries that are properly chargeable to operating the service, including supervision.
- Total expenses incurred for gasoline, lubricating oil, and other expenses properly chargeable to motive power.
- Garage expenses incident to operation.
- Depreciation upon equipment used in all operating services.
- Insurance upon operating property and equipment.
- Costs of handling freight.
- Insurance upon cargo transported.
- Traffic expenses of advertising and solicitation of freight.
- Costs of depreciation through wear and tear and through obsolescence.

These costs must be carefully compiled and translated into unit costs of operation per vehicle-hour, per vehicle-mile, per ton-mile, or per hundred-weight-mile so that adequate and accurate cost data may be obtained for rate computation purposes.

The second function of rates is to cover fixed costs of conducting the business of motor freight transportation, which while they do not vary in proportion to volume of traffic transported are real and hard facts of expense which must be reckoned with as items in any freight rate structure, if the rates are to cover total costs of

conducting the service. These costs include:

- Rentals paid for equipment or other property leased upon the basis of time.
- Carrying charges upon property or equipment needed and used in servicing the public.
- Insurance upon fixed property or equipment which is not chargeable to direct operating expenses.
- Taxes, license fees or other charges paid to local, state or federal governments upon equipment, property, supplies or assets, or upon other basis of taxation or licensure.
- Overhead costs and other expenses of fixed character.

After costs of operation and fixed expenses have been covered, an adequate freight rate structure should produce sufficient revenue to leave a balance adequate to pay a fair return upon the property devoted to the service and a reasonable profit. Motor truck transportation is a business and not pleasure venture. Operators spend their time and devote valuable property to the service of the public for hire and not for their health. There are healthier ways of spending one's time and investing capital than in motor trucks freight operations. The return should be adequate to pay reasonable wages of necessary and legitimate capital investment and to compensate for the inevitable risks of management.

After the general basis of freight rates has been worked out so that it can be reasonably expected to meet operating expenses and fixed charges, and yield a fair return and profit, charges must be apportioned among various items of traffic offered or potential traffic to be developed in such a way that rates will be placed upon each item of actual or potential traffic according to ability of the traffic to "bear the costs of transportation." The term "what the traffic will bear"

has come to have an odious implication among those who take their transportation ideas on the run. There are many who earnestly but mistakenly believe that the term "what the traffic will bear" is another way of saying "all that the traffic will bear," or the last penny that can be wrung by a rapacious transportation company from a reluctant but impotent shipper. Nonsense! The term properly means that transportation companies tend to charge as rates for transportation prices which will develop the maximum amount of traffic for the carriers so as to yield the largest possible net return after covering costs of operation and fixed charges. It means apportioning rates among items of traffic so that shippers of the goods will be able to increase the volume of freight shipped to the point which will yield the carriers the largest net revenue. Adjusting rates to "what the traffic will bear" implies that rates will be reduced when necessary to increase traffic or increased if the volume of traffic becomes so great that carriers in transporting so large a volume of business tend to receive less net return upon transportation of the larger quantity of freight than they would for transporting a smaller quantity because of the tendency of the costs of operation to mount more rapidly than gross revenues after certain quantity limits have been reached. If we may lapse for a moment into language of economic science—for this principle can best be expressed in economic nomenclature—we may say that generally transportation is a business of increasing returns, until a certain limit is reached after which diminishing returns set in, when costs of transporting additional units of traffic tend to increase more rapidly than the return received for transporting them so that net profits are reduced or extinguished completely. If anyone thinks this is an economic exercise or scientific abstraction, let him try to reduce rates to a point where he is literally swamped with traffic at rates below the point where the revenues will cover operating expenses upon the volume of traffic transported, and he will soon discover that it costs real money to fly in the face of inexorable economic laws.

In determining what the traffic will bear the proprietor of a motor freight transportation company or the traffic manager cannot gaze upon a crystal ball and go into a trance and come out

with a rate per one hundred pounds or per ton or per truckload that mystically will yield the maximum net return. It is not so simple as that. Every commercial and transportation characteristic of each commodity transported or which the motor truck line seeks to transport must be analyzed, and rates made after these characteristics are studied from the point of view of the shipper, consignee and consumer as well as from the point of view of the motor freight operator.

Commercial characteristics which must be examined include:

Intrinsic value of goods per pound, per ton or other unit of measurement.

Use to which articles are put.

Value of the transportation service, measured by difference in market price of goods at the place from which they are shipped to the place at which they are received to be used or consumed.

Relative value of the commodity as compared with other actually or potentially competitive commodities.

Inherent qualities of articles, including susceptibility to spoilage and other factors.

Demand for the goods.

Ability of the industry to pay transportation charges upon the goods. This last item may appear vague at first glance, but it is a potent factor in reckoning rates in these troublesome times when certain industries are depressed to a greater relative extent than others, so that transportation companies must temper rate winds to protect shorn lambs.

Transportation characteristics of goods which must be considered in fixing freight rates upon various commodities include:

Cost of loading, unloading and handling various kinds of goods.

Costs of making pick-ups or deliveries at various locations.

Requirement of special equipment to handle and transport the goods, such as lifts or special types of trucks.

Need for refrigeration, ventilation or other services to prevent spoilage or damage.

Amount of space displaced by the goods in proportion to their weight, so that "light" goods may be charged according to amount of truck space and platform space required to transport and handle them, while "heavy" freight may be transported upon weight basis because a smaller space is required.

Type of packing or containers used to transport the freight, so that lower rates may be made upon freight in containers which adequately protect freight or which facilitate handling, while higher rates may be made for the transportation of the same goods in containers which do not adequately protect them, or which do not facilitate their handling.

Inflammable, explosive or other dangerous qualities of goods must be examined so that rates may be apportioned according to risk assumed by transportation companies in carrying and handling.

Danger or risk of damage to property or equipment of the carrier incident to handling and transportation of the property.

Risk of injury to employees in handling goods.

Quantity in which goods are shipped at one time—whether in truckload lots, in less-than-truckload lots, or in multiples of truckload lots.

Regularity of movement of the goods. Seasonable or other variations in quantities of traffic offered.

Direction of traffic—whether a balanced movement in both directions or an unbalanced movement either in direction of predominating traffic flow or in reverse direction.

Distance shipments are to be transported.

Other special factors which are peculiar to certain commodities or shipments which either add to or decrease attractiveness of the traffic to carriers. Among such factors may be mentioned peculiar size or shape of shipments, requirement of C.O.D. service, necessity of guards upon trucks or platforms to protect goods, and other factors.

Although many of the factors about to be mentioned are reflected in operating costs, it is desirable to call attention to them separately because a motor freight traffic officer must be eternally on the lookout for these factors in constructing freight rates.

Effects of weather upon goods—either through increasing risk of spoilage or through interference with operation.

Condition of roads and streets over which routes lie, including condition of road or street surface, obstructions to traffic, detours and congestion.

Density of traffic—that is, the number of freight ton-miles of actual or potential traffic in proportion to the number of vehicle miles operated.

Assurance or possibility of obtaining return loads.

Concentration or distribution of locations at which pick-up or delivery services must be performed.

## Competition

Even if there were no competitive agencies in the field, the task of fixing rates for transportation of goods in motor freight services would not be a simple matter because of complications incident to adjusting rates among shippers and commodities according to the principle of what the traffic will bear. Actually the task is greatly complicated by highly competitive conditions of the transportation field. A carefully adjusted rate structure may be made useless because of rates offered by rival carriers. It is not to be inferred from this statement that motor freight carriers or any other type of transportation company are justified in tossing all reasonable rate considerations out of the proverbial window as soon as competition knocks at the door. If a rate program or policy serves no other purpose it should raise the red flag of warning against rushing in to meet competition at rates that are unremunerative if not confiscatory—or to call a spade a spade—unprofitable if not ruinous. There is a time to solicit traffic aggressively and to adjust rates properly; and there is a time to refrain from seeking traffic at rates that do not earn a new dollar for an old dollar spent in its transportation, or worse yet, rates which return a dollar for a dollar and a half of out-of-pocket costs. That is the sure way to inevitable financial ruin.

Motor freight carriers must adjust rates to meet the reasonable demands of competition, but they must close their ears to the siren song of ruinous competition at inadequate rates if they are to navigate the narrow straits between the frowning financial rocks of Scylla and the whirlpool of Charybdis. This competition is furnished by: railroads, steamship lines, railway express carriers, parcel post service, common carrier motor lines, contract motor carriers, private or industrial motor trucks.

The situation is complicated by rivalry of manufacturers or distributors, and of sources of supply, which tend to draw carriers of different types and in different sections into a mad dance of competition.

Finally, but by no means last in

importance or interest, is the question of regulation. Motor carriers are in a period of chaotic but constantly increasing regulation. A few local governments and many states prescribe not only the form in which motor freight charges are published but control, to a greater or less extent, rate bases and rate policies of motor carriers. These regulations are, of course, binding upon all motor freight carriers subject to jurisdiction of governmental bodies promulgating the regulations. Later articles on this series will discuss regulatory policies and practices of these bodies insofar as they affect rates and other traffic practices of motor carriers.

Let there be any misunderstanding upon the subject, let it be clearly stated that rates for transportation of goods by motor freight carriers can not be worked out at a quiet desk by a traffic superman like an algebra formula, or a crossword puzzle or a contract bridge hand. Rate making is not an exact science; it is an art. Success is attained by careful attention to details of cost, nice adjustment of rates by exercise of discretion and discernment and by trial and error to produce revenues adequate to meet expenses of operation and management, to pay fair return for the operator's effort and capital and to avoid ruin by taking into consideration the competition which may and can be met legitimately. The freight rate lesson is a hard one but it is one that must be learned thoroughly by every type of transportation carrier.

## After Hours

CONTINUED FROM PAGE 28

run its course investors will find that the common stock of railroads has been rendered permanently valueless.

This is a strong prediction which the Michigan Senator attributes to the rapid development of competitive means of transportation.

Our only thought is that if competition is going to bring about this deflation of railroad common stocks to the irreducible zero, to what extent will the motor freight carrier, as part of the competition, benefit by the catastrophe? Will the soundly managed motor freight organizations attract professional promoters? Will the holders of the worthless common stock become railroad enemies and will they be attracted by the promoters to invest in the expansion of motor freight organizations? Will the railroads control these organizations? Or will some smart railroad men get out of the railroading business, set up in the motor freight business and tell the railroads to "go whistle"? Will expansion result in private trunk highways for the exclusive use of motor freight transportation? Will—oh, finish the dream to suit your own ideas.

And at some future time we hope you may repeat the words of Byron: "I had a dream which was not all a dream."

—G. T. H.



# UNIFORM LEGISLATION HELD KEY TO FULL RECIPROCITY

Except in Cases of Clearly Defined Common Carriers, Free Movement of Vehicles Between States Should Not be Hampered, Says MacDonald

By HERBERT HOSKING

**A** MILITANT meeting of the Eastern Conference of Motor Vehicle Administrators in Washington (May 5 and 6) indicated that the truck industry should be flattered (and made wary) by the important place the commercial vehicle occupies in the thinking of the gentlemen who make the rules. The meeting of administrators produced:

1. A strong sentiment in favor of forming a national body of motor vehicle administrators, which would try to agree on problems common to vehicle operation in every state.
2. A resolution by Hon. Benjamin G. Eynon, commissioner of motor vehicles of Pennsylvania, asking the appointment of a committee of administrators to "meet with the representatives of motor vehicle manufacturers for the purpose of studying the relationship between automobile construction and accidents; to assure reasonably safe motor vehicles on our streets and highways . . . to study the effects of new developments, and to consider the entire question of the motor vehicle industry's responsibility in reducing accident hazards."
3. An important address by Thomas H. MacDonald, director of the Bureau of Public Roads, most of which was devoted to questions affecting truck regulation and taxation.
4. A review by Col. A. B. Barber, director of the National Conference on Street and Highway Safety, of progress in the adoption of uniform state legislation affecting the operation of motor vehicles.

With this background the Eastern Administrators staged their more intimate show which included (Act I) hearty indorsement of Mr. Eynon's resolution, after prepared discussion by Robbins B. Stoeckel, Connecticut's commissioner. Mr. Stoeckel's curtain



speech chided the motor vehicle manufacturers for annually dumping in the laps of the "unprepared" commissioners a crop of new vehicles whose performance on the highways was a relatively unknown quantity. Mr. Stoeckel felt that the administrators should have more and better information, for example, on the effect of the possible adoption of free wheeling on trucks. Mr. Stoeckel's sales talk was so good that in addition to Mr. Eynon's resolution the administrators amended their sub-plot to include another requesting the U. S. Bureau of Standards to make available to them information concerning the safety features of lights, horns, etc.

In many respects Mr. MacDonald's speech was the big act of the conference. Liberal in tone, it laid clearly before the administrators the weighed experience of the Bureau of Public

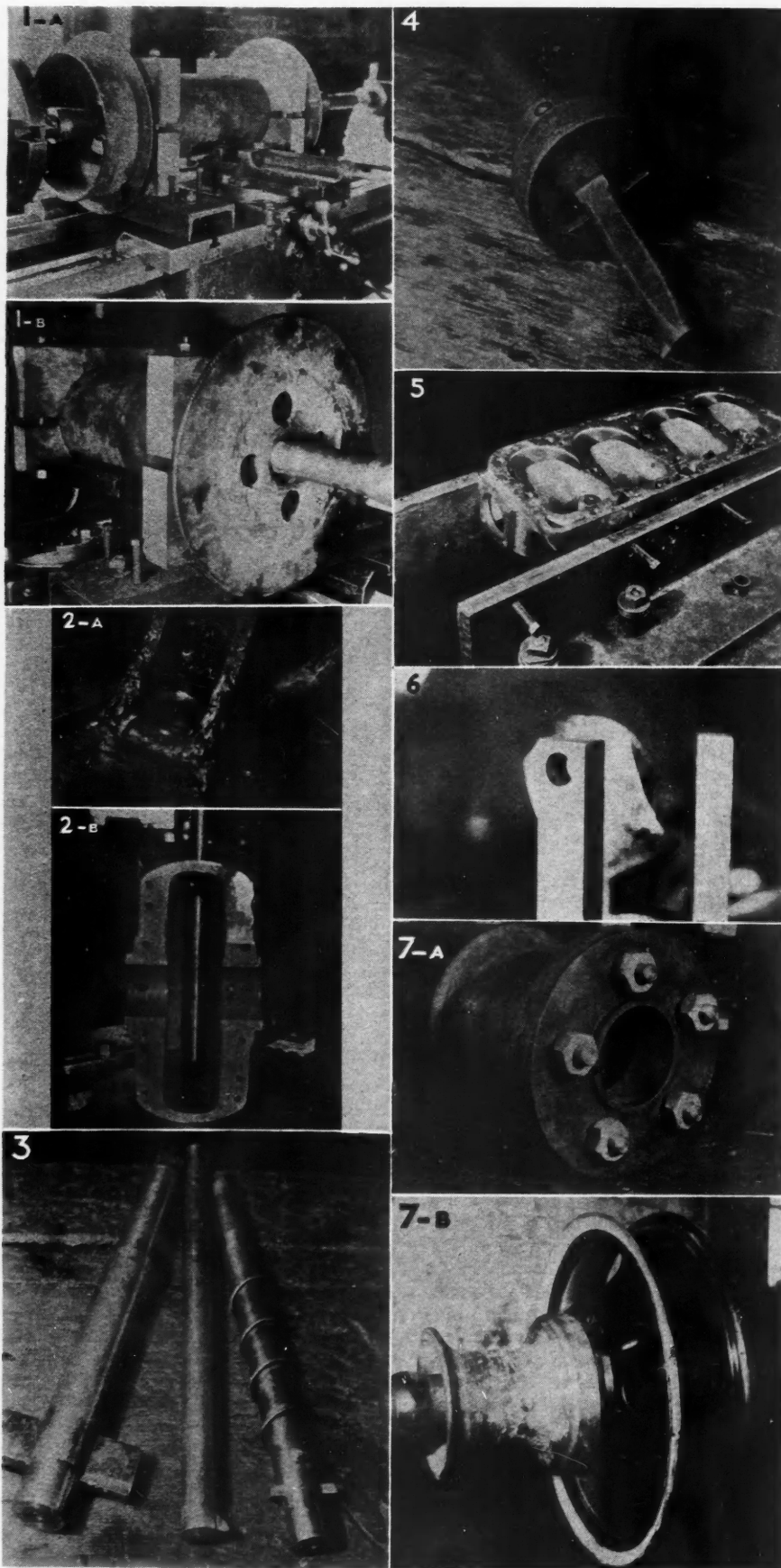
Roads in promoting reciprocity on truck regulation and in studying the effect of truck operations on the highways. Said Mr. MacDonald:

"I am not in sympathy with arbitrary restrictions even when traffic crosses state lines, and I believe that no limitations should be placed except upon clearly defined common carriers, such as buses or trucks operating on a fixed route. In such case I think it is entirely feasible to levy a tax on a vehicle-mile, ton-mile or revenue basis which shall be payable pro rata to each and to leave the annual license fees to be a variable factor whose importance might well depend upon conditions encountered in the individual state . . . I am very strongly of the opinion that the fullest possible degree of reciprocity should be obtained through state regulations."

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# UTILITY CUTS PARTS



(The two groups of ideas, salvage and general, from the motor vehicle shop of the Philadelphia Electric Co., herewith presented, supplement those published in the May issue.)

By JAMES W. COTTRELL

## Salvage

**Fig. 1—Winch Drums**

Winch drums are rebushed in a lathe with a special jig in 1 to 1½ hours, compared with 4 to 5 hours for a less satisfactory hand job. The drum is bushed at each end and bushings bored in alignment to exact size by a boring bar carried on lathe centers.

The special jig supports the drum on the lathe carriage and feeds it across the boring bar fly-cutter. Two pieces of channel, shown in Fig. 1-A, are bolted to the carriage and they support two blocks of wood at each end.

The drum is set up by placing it over the boring bar and then putting the bar, with a cone on each end, in position on the lathe as in Fig. 1-B. Cones are forced into the drum bore to center it around the bar. In this position channels and wood supports are fastened in place about the drum, after which the cones are moved back.

**Fig. 2—Winch Drive Housing**

Salvage saves about \$25 on each case. Winches take a terrible beating on line work and sometimes housings are cracked or broken.

Cracked feet of the drive housing are repaired by bronze welding and machining, Fig. 2-A. The hole is drilled or bored in a floor drill rigged as in Fig. 2-B and the top is faced by the tool shown at left in Fig. 3. A similar setup is employed for boring the housing through the worm shaft opening—Fig. 2-B.

**Fig. 3—Tools**

Left, facer used for machining flat surfaces on bronze welds about holes as in the winch drive case, Fig. 2-A. Center, standard fly-cutter. Right, special bit for boring holes in wood used as bolsters on pole trailer. The spiral wire removes chips.

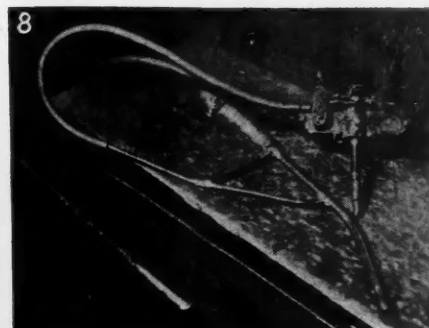
# COST WITH SALVAGE



Fig. 4—Offset Fly-cutter

This shop-made tool is used for a wide variety of boring and turning operations on parts which cannot readily be revolved in a lathe. A bar carrying the cutter is placed in a deep slot in the head and it is held at any desired position in the slot by opposed set screws.

*The Commercial Car Journal*



9-A



9-B

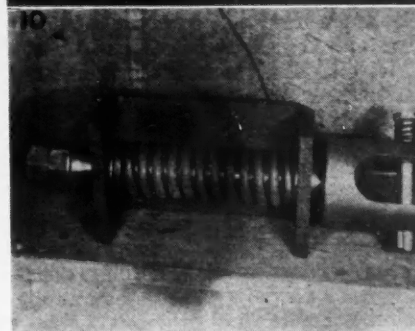
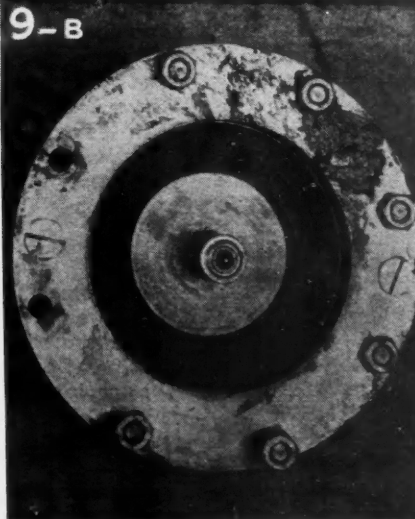


Fig. 5—Cylinder Heads

Warped or uneven cylinder heads are reclaimed by taking light cuts in a shaper. The jig for holding the head in position comprises two heavy angles which are bolted to the bed. Bolts and spacers, made of pipe or tubing, which are carried through the first and

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June, 1932



## Do Diesels Have a Chance Against Gasoline Engines?

CONTINUED FROM PAGE 18

representatives of the American Petroleum Institute cooperating, to tackle the problem for the petroleum industry with the hope of clarifying the matter to some extent. Fuel cost is another important element for consideration.

The only acceptable basis for figuring fuel costs is to compare oil fuel and gasoline on prevailing bulk prices. Some early figures have shown a comparison between premium gasoline at pump prices with the cheapest grades of fuel oil in bulk. This type of computation can't possibly help the Diesel industry.

However, one of the most important elements in the price situation seems to have been overlooked entirely, except by a few individuals like Col. G. A. Green, who are doing their bit to put the thing on a sound basis—that's the matter of fuel tax. And it's a mighty important consideration, for ten states have a gasoline tax of 5 cents; five, 6 cents; sixteen, 4 cents; nine, 3 cents; and the rest 2 cents. Florida has a tax of 7 cents, while Mississippi has a tax of 5½ cents.

It is a delusion to expect that fuel oil will be tax-free if and when the automotive Diesel makes its appearance in some numbers on the highways. Legislators will not brook a depreciation in revenue in this lucrative field. If tax is taken into account, the prices of fuel oil and gasoline get closer together. Of course, the present disparity in price due to the tax differential is very attractive and is an important factor in business abroad.

Unless we know the actual facts from the refiners' point of view, pure logic is likely to lead to false conclusions. Too many people have argued and predicted dire results in the event that there is a heavy demand for Diesel fuel. What are the facts?

### New Fuel Sources

Today there exists a condition of over-supply of crude oil. This was not the case some years back. Moreover, new sources of gasoline have appeared; the first is the development of new refining methods such as cracking and hydrogenation; the other is the tapping of natural gas sources which promise a generous addition to the available gasoline supply.

So much for the economy of the Diesel and trends in prices and taxes of fuel oil. An honest picture of the relative merits of oil and gasoline burning engines also necessitates a comparison of performance.

If there is one characteristic of motorized transport uppermost in the mind of maker and buyer alike—it is performance. You can generally define this in terms of acceleration, flexibility, power and smoothness, without going to further detail.

The Diesel was originally intended and designed for stationary use. Most of the early applications were in power houses and motor ships. Consequently, flexibility was never a factor—but torque characteristics, economy, long life and reliability were. It is, therefore, the opinion of many well-informed engineers that the automotive Diesel will demand a good deal of new research and considerable outlay for development if it is to compete on an equal basis with the gasoline engine's flexibility.

Judging from recent technical papers, only certain makes of Diesel engines now in production can meet the performance requirements of present-day heavy-duty trucks. At the last Transportation Meeting of the S.A.E., Col. G. A. Green described the results of a comprehensive test of a British Diesel engine in a G.M. bus chassis in direct comparison with an "equivalent" gasoline engine. Briefly, the Diesel failed to give fully comparable performance, particularly on acceleration tests. It did not produce the promised fuel economy because under conditions favorable to high power it smoked badly and when readjusted for a clear exhaust which favors economy, power suffered.

### Colorless Exhaust

On the other hand, A. A. Lymans of the Public Service Coordinated Transport reports some highly successful results with another make of Diesel installed on a gas-electric bus. This engine had virtually a colorless exhaust, and specific fuel economy was about 60 per cent better than with the usual gasoline engine. Moreover, Mr. Lyman found the road performance to be quite comparable with that of a gasoline-driven vehicle.

These diametrically opposed conclusions simply prove the point that not all Diesels in production today are suitable for transport units. Great discrimination must be exercised in their selection for any particular use. No doubt, the impetus of the present drive will result in a greater variety of makes suitable for the exacting requirements of road transport.

With this perspective, let us analyze the economic place of the Diesel in the truck industry. The chief advantages are: Fuel economy and favorable torque curve. The suitability of present engines must be gaged by performance tests. It is in this high-production field that the most significant changes in design must come.

If, as suggested earlier, we look at the Diesel in the light of its potential technical development, what are the ideal objectives which might guide the designer? Easily the first of these is performance, comprising acceleration, flexibility and freedom from objectionable exhaust. Next in order of importance is weight per brake horsepower. This must, and in the opinion of many engineers can, be brought down close to weight of a gasoline engine.

We speak of high speed. What is high speed in automotive circles today? According to the COMMERCIAL CAR JOURNAL Specifications Table, maximum horsepower of truck engines is at 3600 r.p.m. in some cases, while 44 models range from 2500 to 3200 r.p.m. To match this, a check of European Diesels shows two makes running at 2000, one at 2500, one at 2200, and eight at 1800 r.p.m.

The problem of smoky exhaust is a serious one. Colonel Green found it decidedly objectionable during the course of his tests. However, W. F. Joachim and many others believe that this can be corrected by careful design. C. B. Dicksee concurs with this in his recent paper read before a joint meeting of English engineering societies and concludes that "the presence of thick smoke when only a moderate percentage of air has been consumed indicates that the method of searching out the oxygen is inadequate, that some parts of the combustion chamber are receiving an excess, while others are receiving a deficiency of fuel, and that an increase in turbulence or a change in nozzle design is called for." Again he says, "About 85 per cent of the oxygen appears to be the maximum which can be utilized and a clear exhaust be retained. By allowing a certain amount of color in the exhaust it is nearly always possible to obtain an increase in m.e.p. without too great a sacrifice of economy. For road work, however, a colorless exhaust is essential."

If the Diesel is to compare favorably with a gasoline engine on the basis of weight per brake horsepower, it is necessary to expend considerable effort in the direction of increasing the mean effective pressure (m.e.p.) In the battle for lower weight, the designer will undoubtedly call upon the strong, light alloys which are now so abundant. Perhaps the most useful of these might be the strong alloys of aluminum, magnesium and possibly beryllium. With the present practice of using centrifugally cast cylinder liners, it is perfectly feasible to have both crankcase and cylinder block of light alloys.

### Smooth Operation

That the problem of smooth running may be satisfactorily solved is indicated by Mr. Dicksee in the following remarks: "An engine which will operate with perfect smoothness under a high load factor may show distinct signs of roughness when running under light loads. This experience appears to be fairly general, and is particularly noticeable under starting conditions and also when running light."

In considering performance, ease of starting is an essential factor if we are to consider the Diesel as a widespread development. Mr. Dicksee suggests, "The question of starting from cold is very greatly modified if some external source of heat is used to in-

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# A MEMBER OF CONGRESS ANSWERS THE RAILROADS

A Letter Written by  
**HON. CHARLES BRAND**  
(Representative 7th Dist., Ohio)  
to W. W. Atterbury, President,  
Pennsylvania Railroad

My dear General: Your letter of March 15th received and I recognize it as a well written statement of the difficulties and ambitions of the railroads. I recognize that the railroad business is at low ebb, that you have lost much business to the trucks, buses and water craft and that it is your right to take account of the situation and to make an attempt to improve your condition.

Your idea is to put the buses, trucks and water craft under regulation for a purpose that does not seem clear to me, for you disclaim any idea of raising the rates of these means of transportation as a result of regulation. I am unable to see the value of this regulation to you unless by this means you get rid of the low rates offered by your competitors.

And I venture to say that if regulation of trucks, buses and water craft comes about the Interstate Commerce Commission will find no way to protect the railroads and advance their revenue except to make rates uniform for all carriers.

This will force rates for buses, trucks and water craft very much beyond the cost of the service.

I do not know much about the cost of water craft transportation and it is hardly thinkable that the rates would be raised on water transportation to the level of the rates by rail, but I do know a little about the cost of carrying goods by truck.

A few years ago you took off the milk train which carried milk from my farms and asked me to find another means of transportation, and I bought a truck and called at the various farms and delivered the milk. You had been charging me 40 cents a hundred for delivering this milk, and I had to bring it to your stations, and after years of experience I find that I can collect this milk at the farms and deliver it for 20 cents a hundred, which is one-half of your rate.

It is argued by some that the trucks do not have to pay for a right-of-way and that the railroads do, but today this is, at least, a debatable question. The high gasoline taxes and the high license plate charges have changed that situation. On the main roads, which are the competitors of the railroads, we are spending annually about a billion dollars, and these same roads are yielding almost identically that amount from gasoline taxes and license plate charges, so the

traffic is paying the entire cost of the main roads.

Should the rates charged by the trucks be raised to the rates charged by ———? That is the question in my mind—in order to avoid this unfair competition as you call it. I know this increase would not apply to the man who owns his own truck, but it would apply to all those whose business is not large enough or continuous enough to own his own means of transportation.

I would like to draw from my own experience again. I have been connected with a manufacturing plant that was worth many thousands of dollars a year to you, but your rates on short haul business have been held so high that you have lost a large part of that business. You retain the long haul business at rates about three times what you charged years ago, but under these circumstances we find ourselves developing plans to split our factory, locating so that practically all hauls will be short hauls so that trucks can handle the business.

My experience outlined is the experience of everybody.

The regulation of your rates by the Interstate Commerce Commission has made your rates so high that in effect an umbrella is held while your competitors take your business away from you and you are more or less retiring from the field at least of local transportation, both passenger and freight. You are closing up your small stations, discharging your agents at these points, discontinuing both passenger and freight service, and even in the larger stations reducing your force to one-fourth what it formerly was and depending upon your long haul business for your revenue.

When this revenue proves insufficient you come to the government and ask for higher rates and secure them. When these higher rates develop diminishing returns you come to the government and ask it to finance you and this is being done, with adequate security, I hope.

Now, shall we raise all transportation cost so to equal yours in the hope of protecting your revenue, or shall we ask you to reduce the cost of running railroads?

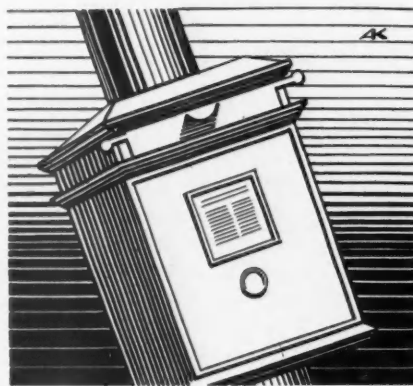
In looking up the salaries of the chief executives of the railroads I find they run about \$75,000 a year. I suppose your other important officials are paid in proportion.

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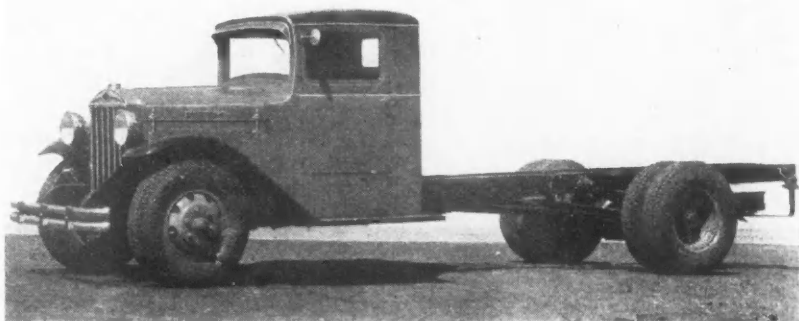
This is an important letter written by Congressman Brand of Ohio in reply to a lengthy presentation of the railroad attitude by General Atterbury of the Pennsylvania Railroad.

It is important not only because it is written by a Congressman who draws upon his own experience for his arguments, but because those arguments form the reason for the present popularity of trucks and for the need to protect them against ham-stringing legislation



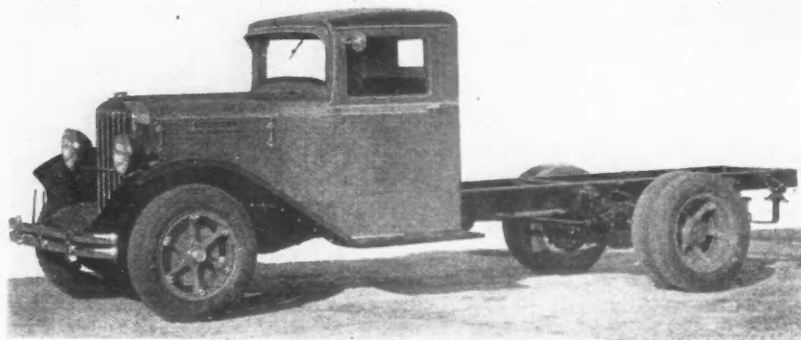
# DIAMOND-T COMPLETES FIVE-MODEL LOW PRICE LINE

Prices Range from \$595  
for the 1½-Ton to \$1,995  
for the 4-Ton Model 510



Below: Model 240A of  
Diamond T's new low  
price line

Right: Radius rods are  
employed in Diamond T  
Model 510



+ See Specifications on page 60 +

IN addition to the new 1½-ton at \$595, which already has lifted Diamond-T registrations for the first quarter to an increase over last year, the Diamond-T Motor Car Co. now announces four more sixes in the "under \$2,000" field, including a 4-ton chassis of 18,000 lb. gross capacity. The leader of the line, the 1½-ton Model 210, was described last month on page 38, but was erroneously headlined at \$795 instead of \$595, the correct price.

The complete line now includes the 1½-ton Model 210, gross capacity 8500 lb. at \$595, the lowest price truck ever put out by this company; 1¾-ton Model 240A, gross 10,000 lb. at \$795; 2-ton Model 310, gross 12,000 lb. at \$995; 3-ton Model 410, gross 15,000 lb. at \$1,595; 4-ton Model 510, gross 18,000 lb. at \$1,995. The characteristic smart appearance of Diamond-T products is carried out in this new line. Fender, hood and cowl lines blend gracefully into those of the cab.

Examination of specifications of these new models appearing on page 62 indicates generally the interesting manner in which this new low price line is built up. Besides maintaining Diamond-T standards, an unusual degree of uniformity of major units is carried through the line such as Hercules engines, Zenith carburetors, cop-

per fin and flat tube radiators, Auto-Lite electrical equipment, Lockheed four-wheel brakes, Ross steering gears and Clark axles except in Model 510 where a Timken is used. Six-leaf helper springs also are standard on all models.

Model 240A is the heavier running mate of Model 210, described last month, having larger capacity frame, springs, rear axle and, of course, greater brake lining area. Its five-cross member frame is 7 x 3 x 7/32 in. and springs measure 42 x 2½ in. front; 53 x 2½ in. rear. The Clark full-floating bevel axle is larger. Brake lining area is 219 in. which is 33 sq. in. more than in the 210. This model is supplied in three wheelbases.

The 2-ton Model 310 is powered by a 3½ x 4¼ in. Hercules developing 68 hp. at 2400 r.p.m. General design and construction of this engine are identical with the power plant of Model 240, which has a ¼ in. smaller bore. The engine is mounted in unit with a 11-in. Borg & Beck plate clutch and Warner Gear 4-speed transmission. In the standard 155-in. wheelbase model, five cross-members are employed in the 7 x 3 x 7/32 in. frame; additional members are used as required in the longer wheelbase models.

The 3-ton Model 410 employs a Her-

Five Diamond-T Low-Price Sixes

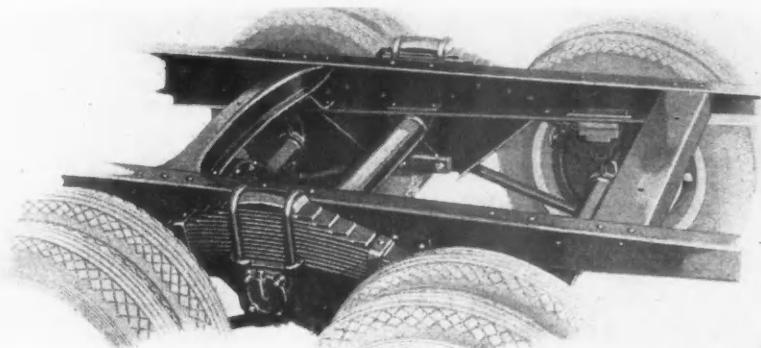
Model	Tonnage Rating	Price	Displacement	Frame Depth
210	1½	\$595	228	6⅜
240A	1¾	795	228	7
310	2	995	263	7
410	3	1,595	298	6½p
510	4	1,995	339	6½p

cules 3¾ x 4½ in. WXB six, developing 69 hp. at 2400 r.p.m. mounted in unit with a 12-in. Borg & Beck clutch and a 4-speed Covert gearset. Power is carried through a two-piece Spicer driveshaft to a full-floating bevel Clark axle. The chrome nickel steel frame has 6½ x 3 x ¼ in. side rails reinforced at the center by fish plates. This model is provided in five wheelbases.

Model 510 is similar in design to Model 410, differences being confined principally to power and size of units employed. The engine, identical except for ¼ in. larger bore with the engine used in the 3-ton model, is a Hercules WXC 4 x 4½-in. six developing 76 hp. at 2400 r.p.m. It is mounted in unit with a multiple-disk Covert clutch and a Covert heavy-duty 4-speed transmission. A two-piece propeller shaft with Spicer joints provides drive to a full-floating spiral bevel Timken rear axle. The hydraulic braking system is amplified by a large size B-K vacuum booster. A chrome-nickel steel frame with fish plates is standard in all wheelbases—two standard of 158 and 168 in. and four options from 131½ to 186¼ in.

Special Diamond-T cabs with crank controlled windshields and windows have been designed for each model. Standard equipment includes speedometer and heat indicator in addition to the usual items. Chrome-plated radiator guards also are standard equipment in the two larger models.

# DODGE PUTS THIRD AXLE ON THREE FOUR-WHEELERS



New Six-Wheelers Range from \$875 to \$1,260 and 1½ to 4-Tons in Capacity

Left: Assembly of driving and driven axle in Dodge 6-wheelers

Below: Both rear axles in Federal A-600D are bevel driven

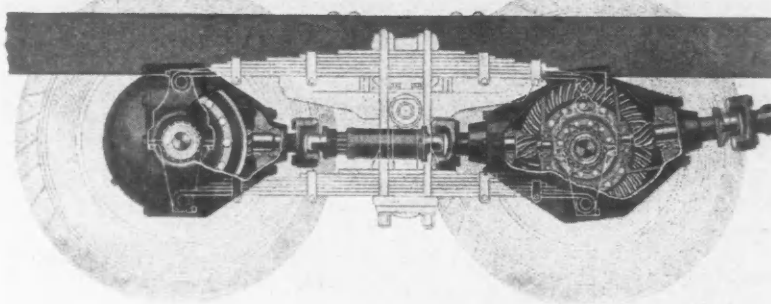
+ See Specifications on page 60 +

**D**ODGE BROTHERS CORP., division of Chrysler Motors, has supplemented its four-wheel models in the 1 to 3-ton range with three two-wheel drive, six-wheel models. They comprise Model UGS-50, a four-cylinder job, having payload capacity of 1½ to 3 tons and priced at \$875; Model GS-50, a six-cylinder chassis of the same capacity, listed at \$935, and Model GS-55, another six, rated at 2 to 4 tons and priced at \$1,260.

Models UGS-50 and GS-50 have a mean wheelbase of 153 in. and are counterparts of present Dodge four-wheel Models UG-30 and G-30, respectively, with the following exceptions: Frames are of heavier construction at the rear with bumper supports over trailing axle; 15¼-in. fuel tank is mounted outside of frame at right; service brakes are six-wheel hydraulic, vacuum booster actuated; drums are cast iron, 12-in. diameter in front and 14 in. in both driving and trailing axles.

Model GS-55, developed from the present four-wheel G43 model and having a mean wheelbase of 158 in., follows the same general lines of six-wheel construction embodied in the two lighter six-wheelers except for a heavier frame, which is the same as in the four-wheeler, 8½ x 2 51/64 x 11/64 in.

Inverted semi-elliptic alloy steel springs, 43½ x 3-in. nine leaves, are U-bolt clipped to trunnion mounting on a 3½-in. steel tube riveted to the frame. Spring ends are bolted above driving and trailing axles. The trunnion is connected by torque rods extending to the under side at each end of each axle. Torque reaction of the driving axle and brake reaction of both axles are carried through these torque rods directly to the frame. The design is also claimed to maintain constant traction for the driving axle regardless of whether the truck is going forward or backward.



## FEDERAL DRIVES 600's THREE WAYS

Line Comprises Four 4-Wheelers and Two 6-Wheelers, One 2-Wheel Driven

+ See Specifications on page 60 +

**A** COMPLETE new series of trucks, with the basic designation of A-600, has been developed and is being produced by the Federal Motor Truck Co. The series consists of four models of conventional four-wheel design and two six-wheel trucks. With the exception of rear axles and minor details all models of the series are identical, with the exception, of course, of such items as frame dimensions, springs, etc.

The four-wheelers are rated at 3 to 3½ tons with the exception of Model A-600, which is rated at 2½ to 3 tons. The prices are as follows: Model A-600 with Clark bevel rear, \$1,750; Model A-600T, Timken bevel rear, \$2,045; Model A-600TW, Timken worm rear, \$2,180, and Model A-600TDR, Timken double reduction, \$2,180.

The six-wheel units, rated at 4½ to 5 tons, are of two types. Model A-600SW, priced at \$2,395, has an idle axle ahead of a single bevel gear drive rear axle, while Model A-600D, listed at \$2,795, employs both rear axles for driving purposes. In the latter, drive is by spiral bevel, with an extra pinion at the rear of the forward axle for driving the rear unit.

Powerplants are more powerful than employed previously in this tonnage class. The engine is a 3 11/16 x 4½-in. Continental E-600 developing 73 hp. at 2600 r.p.m. Transmissions are improved and have anti-friction bearings throughout including the reverse idler. On the new trucks unusually deep fish-plates are provided on the frames at no extra cost. On the six-wheel units these fish plates are 14½ in. deep and of ¼ in. stock.



# SPICER ADDS AUXILIARIES AND TWO POWER TAKE-OFFS

To increase the capabilities of trucks is the purpose of three new auxiliary transmissions and two companion power take-offs which the Brown-Lipe Gear Division of Spicer Mfg. Co. has added to its line.

The three auxiliaries, all of amidships-mounted type, include Model 222, which furnishes a direct drive and a reduction, which may be used as an overdrive or underdrive, and Models 603 and 703 which provide a reduction, direct drive and an overdrive. Take-offs for Models 603 and 703, which bear the corresponding model numbers, are of the top-mounted type and are assembled to the auxiliary transmission by removing the shifter housing assembly. Both top-mounted take-offs provide two speeds "forward" and a reverse and are designed to transmit full engine torque.

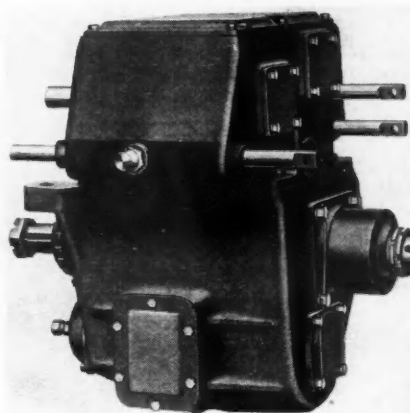
Model 222 auxiliary, designed for torque of 465 ft. lb. at 500 r.p.m., has one large S.A.E. take-off opening on left side, viewed from the rear. Ratios are direct and underdrive ratio of 1.52 and engagement is effected by a sliding clutch gear. Both front and rear shafts are carried on annular ball bearings. A speedometer aperture in the rear mainshaft bearing cap is standard and an 8¼-in. brake drum is furnished as optional equipment.

Auxiliary Models 603 and 703 are similar in design, the former being intended for 250 ft. lb. torque in overdrive at 1000 r.p.m. and 473 in underdrive at 500 r.p.m., while corresponding figures for 703 are 450 and 1280 ft. lb. respectively. Model 603 furnishes a reduction of 2.25, direct and overdrive of .67, and Model 703 is geared 2.62, direct and .747. Torque ratings of the three are nominal and subject to approval for installation in individual truck models.

Roller bearings are used throughout on Model 603, including front and rear shafts and countershaft. Ratios are engaged by internal-external gear-type clutch for direct and sliding gears for low and overdrive. Speedometer aperture is furnished in rear mainshaft bearing cap. Two standard S.A.E. large take-off openings are incorporated in the case, one in each side, these being in addition to the top-mounted full torque take-off assembly.

Model 703 auxiliary gear box employs annular ball bearings on main and countershafts. Gears are engaged in the same manner as in Model 603 and speedometer drive and take-off openings also are similar.

## Top Mounted Take-Offs Provide Two Speeds Forward and a Reverse



Take-off in the new Brown-Lipe auxiliary is top mounted by removing shifter housing

A main frame control is available for both Models 603 and 703. It can be mounted on pad on control cover of standard transmission or on a cross member.

## "I Wish I'd Rented Trucks Years Ago"

CONTINUED FROM PAGE 16

Under the fuel economy bonus plan drivers are compensated for reaching or exceeding a predetermined mileage per gallon. This plan was put into effect when trucks were averaging 6 and 7 miles to a gallon of gasoline when the expectancy was 9 to 10. So now drivers get 50 cents the first month they hit the mileage estimate and 50 cents additional each month thereafter until the accumulation reaches \$2.50. Once this sum is reached the driver receives \$2.50 so long as he continues to hit the fuel mileage estimate. And as in the case of the accident bonus he is penalized by being compelled to go back to the 50-cent base when he turns in a month's record below the estimate.

As a result of these bonus plans drivers are shutting off motors when they make stops and driving carefully to avoid accidents. They have before them the objective of \$7.50 extra each month from an outside source.

Combined with these incentive plans, drivers are called together periodically. The party is at the expense of Universal Truck Rental Corp. and in connection with it they are instructed in such matters as will tend to make them better drivers.

In thus dealing with drivers—the important human element in his rental plan over which he has no direct control—Mr. DeLisser practices a business philosophy which his nine years as a dealer have found successful. "Make business a game," is his creed, "and appeal to the pocketbook."

Nightly storage of rented trucks has been ideally arranged in the Universal set-up. Operators consider it objectionable if the storage space is remotely situated from their business establishments. It means lost time and wasteful mileage. In making his storage arrangements Mr. DeLisser was not hampered by a DeLisser-owned garage which needed filling. Consequently, in dealing with the problem he strove for a solution most agreeable to the operator. And since there could be no agreeable solution without convenience, he arranged for storage space in three strategic locations in Manhattan: Uptown East, Midtown West and Downtown. (Refer to aerial photograph.)

As operators are added by Universal they will be assigned, whenever convenient, to these garages. Other storage points will be added when expansion calls for them. Flexibility of the organization makes it possible even to use the garaging facilities of an operator who has been won over to the rental idea. One of the present storage points is such a case. Universal simply enters into a separate contract with the operator for storage space.

Garages are selected not only for their storage space but also for their shop equipment.

The service crew consists of two men. They visit each garage every other night. They carry such tools as are necessary for preventive maintenance, adjustments and minor repairs. Emergency service is available to the operators day and night. If a truck is to be overhauled, or if it has been badly damaged in an accident, it is taken to the DeLisser Motors service shop at First Avenue and Ninety-fifth Street. For such work DeLisser Motors bills Universal as it would any other customer.

Universal now has 14 rental customers operating 46 trucks, varying from de luxe town car delivery equipment to furniture vans.

# TIMKEN

## TRAILER

# AXLES

### *Today's Design for Today's Traffic...*

Timken, first in modernizing trailer axles engineered for approved standard types of brakes, introduces tubular axle beams.

#### **MORE RIGIDITY**

— less deflection of axle beam. Deflection causes irregular tire wear. Deflection depends on "moment of inertia", which is much greater in tubular sections than in other sections of beam commonly used.

#### **MORE STRENGTH**

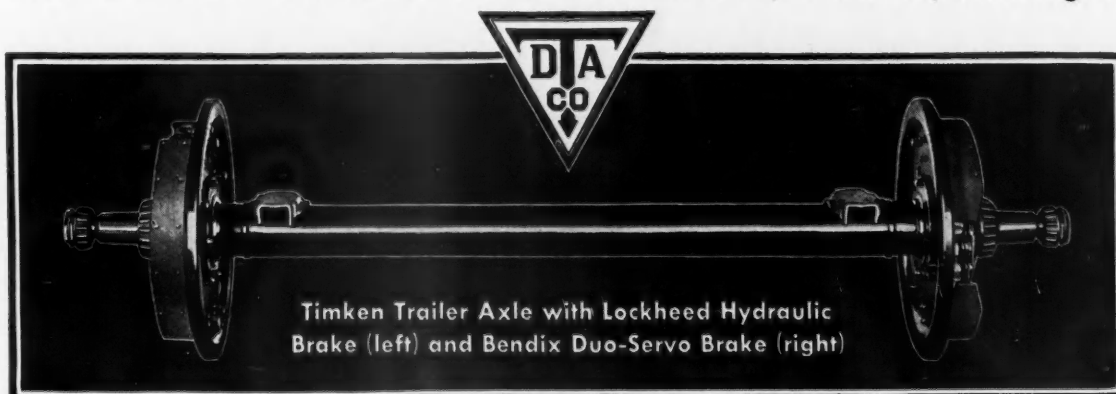
— the tubular construction of axle beam, as followed only by Timken, offers more torsional strength than axle beams commonly used. The disposition of metal in the beam makes for maximum strength values.

#### **LESS WEIGHT**

— capacity for capacity, Timken tubular axle beams weigh much less than other types of axle beams.

Timken Axles are also available for brakeless trailer conversions as factory engineered units in conjunction with Bragg-Kliesrath or Bendix-Westinghouse Power Brake units through authorized distributors of those companies.

**THE TIMKEN-DETROIT AXLE COMPANY, Detroit, Michigan**





## AUTOMOTIVE FLASHES

### S.P.A.R. to Help Sales

Certain sales activities on all vehicles manufactured by Studebaker and its subsidiaries will be combined in the newly formed S.P.A.R. Sales Corp., of which Paul G. Hoffman, vice-president of the Studebaker Corp., will be president. This new corporation will make available to Pierce-Arrow, Rockne and S.P.A. truck dealers the facilities of the 18 branch offices formerly serving Studebaker dealers only.

### Fruehauf Spreads

Four new factory branches, bringing the total to 15, have been established by the Fruehauf Trailer Co. They are located at Omaha with A. W. Peters in charge; Grand Rapids with Carl C. Gibson as manager; Jackson, Mich., with A. B. Hart, and Buffalo under M. J. MacQuarrie.

### 1931 Ford Loss

Statement of the Ford Motor Co. for year ended Dec. 31, 1931, recently filed in Massachusetts, showed in the profit and loss account a decrease (or indicated loss) of \$53,586,000 after dividends. This compares with indicated earnings of \$44,460,823 in 1930 and \$81,797,861 in 1929.

### Turns to Dodge

DeLisser Motors, Inc., formerly New York City's leading Ford dealer, has given up his Ford franchise and taken on that of Dodge and Plymouth. Horace E. DeLisser, president, is well known for his truck activity. His truck rental setup is described in this issue.

### To Make Money Work

Alfred P. Sloan, Jr., president, General Motors Corp., is one of the committee of 12 named by Governor Harrison of the Federal Reserve Bank of New York to "consider methods of making the large funds now being released by the Federal Reserve banks useful affirmatively in developing business."

### Expando Manual

A 40-page manual, outlining how manufacturers, wholesalers and dealers can profitably employ sales trucks to increase sales and cut sales costs has just been published by the Expando Co., 105 W. Adams St., Chicago.

### April Truck Sales

April factory sales of trucks made in U. S., according to the Bureau of Census, were 27,141, compared with 19,560 in March, 50,022 in April, 1931, and 71,092 in April, 1930.

### Flares for Trucks

Flares, known as Centralite, are being offered by the Central Railway Signal Co., Inc., Newton, Mass., to motor carriers for protection against highway collision in cast transports are stalled in dark or fog.

### Unfilled Orders

Decided improvement in sales is reported by Sterling Motor Truck. The company entered May with more unfilled orders than any other time since spring 1930.

### Keeps Record Up

Reo Speedwagon sales during April exceeded by 5.5 per cent the total set up in April, 1931. This is the tenth consecutive month that Reo sales exceeded those of the corresponding month last year.

### Stepping Up

A gain of 33 per cent in sales for April over March was reported by E. J. Bush, vice-president of Diamond T Motor Car Co. A marked increase in export demands is also reported by Mr. Bush.



## PERSONNEL CHANGES

★ Carl Parker has been named head of the truck division of the Reo Motor Car Co. He was previously in that capacity for many years. Mr. Parker, until recently, was associated with Federal Motor Truck as supervisor of branches.

★ Harry Vested, for many years distributor of Trailmobile and Lapeer trailers, has joined the B & J Trailer Co. in charge of national accounts and fleet owner distribution.

★ M. L. Pulcher, president of Federal Motor Truck Co., has assumed active charge of sales following the resignation of Henry Krohn, former vice-president in charge of sales.

★ W. J. Kersler succeeds G. H. Ribble as Dodge Brothers truck representative in Portland, Ore. Lee L. MacLellan received appointment as truck representative of the Minneapolis zone, succeeding Frank A. Smith, who has been transferred to Chicago.

★ W. A. Knuckey, who has been with the Fageol Motor Truck Co. for 12 years in a sales capacity, has been appointed vice-president and general manager of the San Francisco, Calif., branch. He replaces temporary manager W. J. Mildrum, who has been transferred to the Philadelphia branch.

★ "Bill" C. Mullin, president of William C. Mullin, Inc., Lancaster, Pa., distributors of Dodge products, has sold his interest in the firm to Thornton Fuller Auto Co., Philadelphia. Mr. Mullin, old-timer, has no plans for immediate future.

★ J. F. O'Shaughnessy, general manager of the tire department of the United States Rubber Co., has been appointed vice-president in charge of sales of the company's entire group of products.

★ H. C. Howard, formerly Chevrolet zone manager at Amarillo, is now zone manager at Indianapolis, succeeding G. R. Browder, who has been assigned other duties with General Motors.

★ W. J. Graveson, formerly Boston city sales manager, was named manager of Portland, Maine, zone, succeeding F. J. Hackett, assigned to other duties. E. W. Berger succeeds Graveson in Boston.

★ Walter E. Shanahan succeeds J. D. Burke as Dodge Brothers New York Regional truck representative. Mr. Burke was recently named director of truck sales at the factory.

★ L. J. Ouellette, formerly assistant advertising manager of Dodge Brothers Corp., has been named assistant to A. vanDerZee, general sales manager.

★ W. L. Barth has taken over the work of R. C. Koehler, who has resigned as assistant director of service for the General Motors Truck Co.

★ D. W. Downey has been appointed vice-president of the Fargo Motor Corp. in charge of railway sales.

★ James J. Newman has been named as assistant to James D. Tew, president of the B. F. Goodrich Rubber Co.

★ James E. Hale of Firestone Tire & Rubber Co. was chosen president of the Tire and Rim Association, Inc.

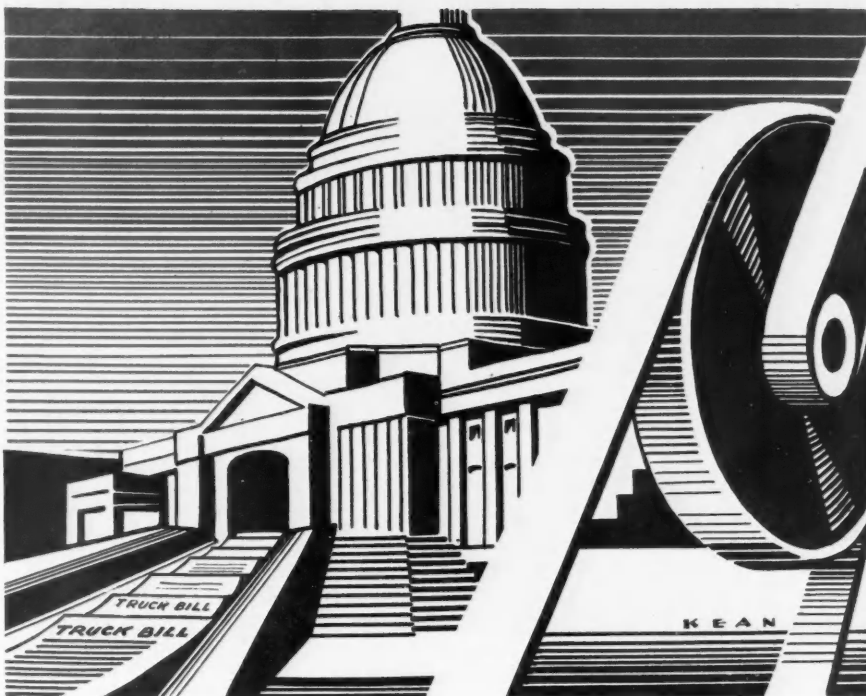
★ Glenn A. Sanford has been named sales manager of the Motor Wheel Corp.

★ Milton A. Holmes, sales manager of Reo's truck division, has resigned.



### A Service for Readers

Commercial Car Journal is prepared to serve readers who desire legislative information pertaining exclusively to motor trucks. State your problems clearly and in detail and address your communication to the Editor. Replies will be mailed as quickly as the information can be procured.



## LEGISLATIVE MILLS GRIND SWIFTLY AND EXCEEDINGLY ROUGH

THE Wisconsin legislature handed a "lemon" to the public service commission to administer in the form of the so-called ton-mile truck law, which, after employing several months and a large staff of inspectors and clerks to solve, has been practically nullified by a paragraph in the State Supreme Court decision on the case.

Justice Walter C. Owen's written opinion gave approval of the constitutionality of the act, denied the Wisconsin Allied Truck Owners an injunction, and authorized the public service commission to proceed—but the following important statement regarding exemptions on weights by Judge Owen has virtually closed the case, and limited its enforcement to less than 4000 trucks and under 1000 trailers.

"We know that the legislature intended to exact a ton-mile tax from some trucks but not from all trucks. The language used in the statute indicates that it is intended to exempt trucks having a net weight of 6000 lb. It appearing so clearly in other parts of the act that the term weight is used to indicate the net weight of the truck as distinguished from the net weight of the truck plus its carrying capacity, we feel that as it is used in the exemption provision it must be so

construed. We are therefore forced to the conclusion that sec. 194.16 does not apply to any trucks which did not have a net weight in excess of three tons, and the expression 'aggregate weight of such units' as used in the exemption obviously means the net weight of the combination."

Tracing back to the beginning of the enforcement attempt, the commission sorted over the licenses issued to 124,000 trucks in 1931, and found that 30,667 of them apparently belonged in the lists subject to their interpretation of the law on weight limits. When returns were in on those 30,667 trucks certain definite exemptions stated in the law further reduced the taxable number. Such points as travel within the limits of cities and villages only, trucks carrying farm produce from production point to primary market, and similar clauses eliminated a number from this original group.

At any rate, when the court handed down its decision the commission had collected \$5 fees for permits under the law from owners of 14,200 trucks and 645 trailers. These fees were turned into the general fund for highway maintenance later. However, the court decision removes all but about 4000 trucks on the net weight exemp-

tion. This means that the State must return nearly \$50,000 in permit fees and stands to collect, at the average mileage tax of \$50 per truck, about \$20,000 or so in taxes.

This meant the dismissal at once of 37 clerks and inspectors. Inspection is impossible, if not impractical, under the decision, because to determine the net weight of a truck on sight is difficult. The little joker in the decision upset the entire plan fixed by the commission to interpret the ideas of the legislature, and now the principal goal in sight by railway brotherhoods and other ton mile taxers is to draw up a new bill for amendment of the present law when the 1933 legislature meets in January.

Several officers of the commission have admitted that the original law is a Jonah, and the court decision not only defeats the law as it stood, but renders its partial enforcement wholly unfair if based on actual load weights on highways.

For instance, a truck may weigh 5999 lb. and load up with three tons freight, making 11,999 lb. The tax is based on net truck weight, so this truck goes without an odometer or a mileage tax. Another truck may weigh 6010 lb. and load up with the

same freight tonnage, which would be 12,010 lb., or only 11 lb. more than the first truck carries. But this truck must pay a tax because of its overweight above the limit of exemption. And furthermore, it must pay the mileage tax not only when running loaded but when running empty as well. One goes free and the other pays a tax, with only 11 lb. difference.

Farmers manage to force the commission through extra legislative pressure and hearings to exempt all rural commodity carriers, and that position was amply sustained in the court decision. That was regarded as such a victory that the commission was relieved of considerable concern over rural opinion; but the new and final blow came with the court order, which not only exempted farmers but exempted 75 per cent of all the trucks listed in the files due for a generous milking.

The victory came somewhat as a surprise for the attorneys for the truck owners also, because they made but a slight and minor mention of the net weight point in their brief. Whether with this sad experience the 1933 legislature will tackle the truck problem freely or not remains to be seen.

The ton-mile tax rates provided by the law are as follows:

Gross Weight of Vehicle	Tires	
	Pneumatic	Solid
7 tons or under	\$0.001	\$0.002
Over 7 to 8, inclusive	.001125	.00225
Over 8 to 9, inclusive	.00125	.0025
Over 9 to 10, inclusive	.001375	.00275
Over 10 to 11, inclusive	.0015	.003
Over 11 to 12, inclusive	.001625	.00325
Over 12 to 13, inclusive	.00175	.0035
Over 13 to 14, inclusive	.001875	.00375
Over 14 tons	.002	.004

### ARKANSAS

The Arkansas law taxing the intrastate revenue of an interstate operator was upheld in a decision handed down by the Supreme Court of Arkansas. The law levies a 4 per cent tax on the gross revenue of for-hire truck operators.

### CALIFORNIA

An Initiative Petition, filed with the California Attorney-General and proposing to amend the State Constitution so as to increase fees for commercial vehicles and reduce allowable weight and size, is being circulated to obtain 150,000 signatures. If these are obtained the amendment will be voted on Nov. 8, and, if passed, become effective Jan. 1, 1933.

The petition seeks to impose a tax on vehicles transporting property "for private gain," whether operating within or without municipal limits, of \$25 for those up to 3000 lb. gross weight, and \$2 per 100 lb. gross weight in excess of 3000 lb. This tax to be in addition to the 5 per cent gross income tax and/or registration fees now imposed.

Also to fix the maximum length of any vehicle or combination of vehicles at 35 ft., and maximum gross weight of any vehicle or combination of vehicles at 22,000 lb.

It would also fix penalties for overloading at \$4 per 100 lb. of gross weight in excess of registered weight, and for over-length at \$1 per inch of length in excess of 35 ft. If penalties are not paid when directed by court, then vehicle and load may be seized and sold by the state.

The petition makes a play for automobilists' support by proposing a gasoline tax reduction from 3 to 2 cents.

### KENTUCKY

Kentucky has passed new size, weight and speed restrictions, prohibited full trailers and imposed drastic regulations and high mileage taxes on common and contract carrier trucks. Weight provisions become effective Jan. 1, 1933, and other provisions June 18, 1932.

Restrictions are as follows: Size—Height, 11½ ft.; width, 96 in.; length, including load, single unit 26½ ft., semi-trailer combination 30 ft.

Weight—Any truck or semi-trailer combination is limited to 18,000 lb. gross. Authorities may reduce weight whenever highway conditions require.

Trailers—All trailers are prohibited.

Speeds—30 m.p.h. for gross weight of 5000 lb. or more; 40 m.p.h. under 5000 lb.; within municipalities 20 and 25 m.p.h. respectively. Authorities may reduce speeds if conditions require.

Governors and Lights—Trucks and semi-trailer units must be equipped with governors and with stop lights. Units over 84 in. wide must have clearance lights.

Municipal Registration—Cities and incorporated towns are empowered to issue registration plates, charge fees and to establish size, weight and speed restrictions for units operated intracity or intratown. They may also permit trailers.

The regulatory law exempts trucks weighing unladen

less than 5500 lb.; trucks owned or leased by a non-profit cooperative association carrying only property of the association or its members; vehicles carrying only property of owner, or vehicles not usually "for hire," but making occasional trips to transport another's property.

All other "for hire" common and contract carriers are placed under the authority of the State Tax Commission. Common carriers must obtain certificates of convenience and necessity, granted only after public hearing, and must file bond or take out insurance to protect patrons and public, and post bond to guarantee payment of fees, etc. The commission may prescribe common carrier routes, operating schedules, rates, uniform system of accounts and require filing of reports or fix other requirements believed necessary.

Contract carriers must obtain a permit, must file charges, rates, etc., and bonds or insurance policies the same as common carriers. Contract carriers are forbidden to "give or cause any undue or unreasonable advantage or preference" to those they serve "as compared with the patrons of a common carrier" or "by unfair competition to destroy or impair the service or business of a common carrier." Whenever complaint is made of a violation of this section the commission may prescribe rates and classifications to remove such violation.

The following truck fees are fixed, in addition to fees now charged: When unladen weight exceeds 5500 lb. but not 3 tons, ½ cent per mile, and an additional ½ cent per mile for each ten or fraction thereof in excess of 3 tons. Interstate trucks, not paying Kentucky registration fees, shall pay 30 per cent over the above mileage fees, and when solid-tired, 50 per cent over.

### NEW JERSEY

New Jersey has adopted a law, effective July 1, 1932, under which a non-resident operator of any motor vehicle, including one operated "for hire," is granted the same privileges with respect to operation in New Jersey under the plates of his home state that a New Jersey operator is granted in the home state of such non-resident operator.

### NEW YORK

Temporary and permanent increases have been made in New York license fees on commercial vehicles. Under the permanent increases, applying to new vehicles first registered or used vehicles re-registered on or after July 1, 1932, trailers will pay 100 per cent over fees now paid and semi-trailers will pay 80 cents per 100 lb. net weight instead of \$4 per ton gross weight as now paid. Storage battery electric vehicles will pay 50 per cent over present fees.

Temporary increases apply to omnibuses, storage battery electric vehicles—50 per cent over permanent fees and all other vehicles—65 per cent over permanent fees. The temporary vehicles apply to vehicles first registered or re-registered on or after July 1, 1932, for any of the period commencing on July 1, 1932, and ending Dec. 31, 1933, vehicles registered during 1932 need not re-register until March 1, 1933.

Beginning July 1, 1932, the allowable length of combinations is reduced from 85 feet to 65 feet.

### SOUTH CAROLINA

The South Carolina gross receipts tax on interstate motor carriers was held unconstitutional by a Federal District Court after hearing the case of Nutt vs. Ellerbe, et al., involving a revenue tax of \$813.84. The tax, imposed by the 1931 Legislature, was declared invalid insofar as it applied to interstate operators because it includes taxation on interstate gross revenue as well as on intrastate and therefore constitutes a direct burden on interstate commerce.

The act provided that each for-hire carrier shall pay a tax on its gross revenue calculated on the proportion existing between the gross income of such carrier and tax administration costs of the Motor Transport Division. The court implied that had this tax on the revenue of interstate carriers been restricted in application only to that portion of revenue derived from operation within South Carolina it would have been constitutional.

The court further held that the 1925 Regulatory Act is invalid as applied to contract carriers because it exempts "farmers and dairymen hauling farm products, and lumber haulers engaged in transporting lumber and logs from the forests to shipping points."

### TEXAS

The Texas law regulating the size and weight of loads of commercial vehicles operating over Texas highways has been sustained by the United States Supreme Court. The 7000 lb. net load provision, therefore, stands.

### VIRGINIA

Virginia has enacted new legislation dealing with size and weight restrictions, common carrier regulation and taxation.

Size—Width, 96 in.; height, 12½ ft.; length, single unit, 33 ft., combination, 45 ft. (The previous combination length was 85 ft.) Combination length will not apply to two-unit combinations now registered and operated with the permission of the State Highway Commission or to three-unit combinations now registered and having a gross weight of not over 20,000 lb., until April 1, 1934. Only one trailer will be permitted, except that semi-trailer units towing one trailer now registered may continue, with the commission's permission, until April 1, 1934.

Weight—One axle, 16,000 lb. gross; 4-wheel vehicle, 24,000 lb. gross; 6-wheel vehicle, 35,000 lb. gross. (Dual wheels shall be counted as two wheels). 40-in. minimum axle spacing specified.

Taxation—Private Trucks—Registration fees on 1-ton or less, 1½-ton and 2-ton private trucks remain the same at \$15, \$20 and \$30, respectively. From there on fees have been increased, ranging from a fee of \$50 on a 2½-ton truck to \$1,150 on a 10-ton. Private Trailers and Semi-Trailers—½-ton capacity or less, \$10, otherwise pay one-half the fees provided for private trucks. Private Tractors—Same as trucks. For-Hire Trucks, Tractor Trailers and Semi-Trailers (other than common carriers)—One and one-half times the amount paid when privately operated.

Common carrier regulation covers all such carriers operating for hire over any public highway and/or between any incorporated communities. Exceptions are wholly intracity or intratown operation, and carriers for hire whose business originates wholly within the corporate limits of any city or town which are temporarily operated beyond said limits.

The State Corporation Commission is in control of regulation and is given authority to fix rates and

charges, supervise schedules, service, methods, hours of service, prescribe uniform accounting system and grant, refuse, amend or revoke Certificate of Convenience and Necessity.

Common carriers must procure certificates and file insurance policy or bond covering public liability and cargo damage. Interstate operators get a certificate as a matter of right and are specifically exempted from any license or tax for privilege of engaging in business.

Fees and Taxes—Common carrier trucks operating either exclusively in intrastate commerce or partly in intrastate and partly in interstate pay yearly, on or before April 1, for regular equipment, a license fee of 70 cents per 100 lb. of chassis weight plus rated capacity, and 25 per cent of this for substitute or emergency equipment. In addition they must pay quarterly, on or before the 15th of April, July, October and January of each year, a road tax of 2 per cent of the gross receipts from the intrastate operation in Virginia.

Common carriers operating both in intrastate and interstate commerce pay the same license fee as above, the same quarterly gross receipts tax on intrastate business and an additional quarterly road tax of 2 per cent of that portion of the gross receipts derived from the interstate business which the total mileage in Virginia bears to the total intrastate and interstate mileage (excluding mileage in cities and towns which maintain the streets used by the carriers). Should the additional road tax become "inactive" the following substitute fees, based on net weight, are provided: 5000 lb. or less, ¼ cents per mile operated in Virginia; 5000 to 15,000 lb., 1½ cents; 15,000 lb. and over, 2½ cents.

Common carriers operating exclusively in interstate commerce pay the yearly license fee and a quarterly road tax similar to the additional road tax explained above. Furthermore the above substitute fees are provided should either the yearly license fee or the road tax become "inactive." Should both these become "inactive" mileage fees double the mentioned substitute fees are provided in lieu of all other taxes. Common carriers operating tractor trucks with semi-trailers attached, in lieu of the 70-cent yearly license fees provided above, pay: Tractor, 50 cents per 100 lb. chassis weight plus rated capacity. Semi-trailer, 50 cents per 100 lb. actual carrying capacity.

In addition cities and towns through which carriers operate may impose reasonable charges, not exceeding one-fifth of a cent per mile for 5000 lb. or more of net weight, two-fifths for 5000 to 15,000 lb. and three-fifths for 15,000 lb. and over.

Charges imposed by the act are "in lieu of all other taxes whatsoever laid by the state against such carriers."

## Truck Legislation Will Not Be In Line for Passage in 1932

CONTINUED FROM PAGE 20

the subject a state may prescribe such regulations for motor vehicles in both intrastate and interstate commerce, at least so long as it does not directly burden or interfere with interstate commerce. However, it was stated in order to obtain desirable uniformity of regulations as to qualification of drivers, hours of service of employees, and the size, length, weight of load and speed of vehicles, "it may eventually become necessary for Congress to occupy this field."

The Senate Committee accepted the commission recommendation against any regulation of trucks at this time beyond the issuance of permits and the securing of full information in regard to their operations. The substitute merely makes it the duty of the commission to "administer all other provisions of this act relating to motor carriers and to prescribe regulations for such administration."

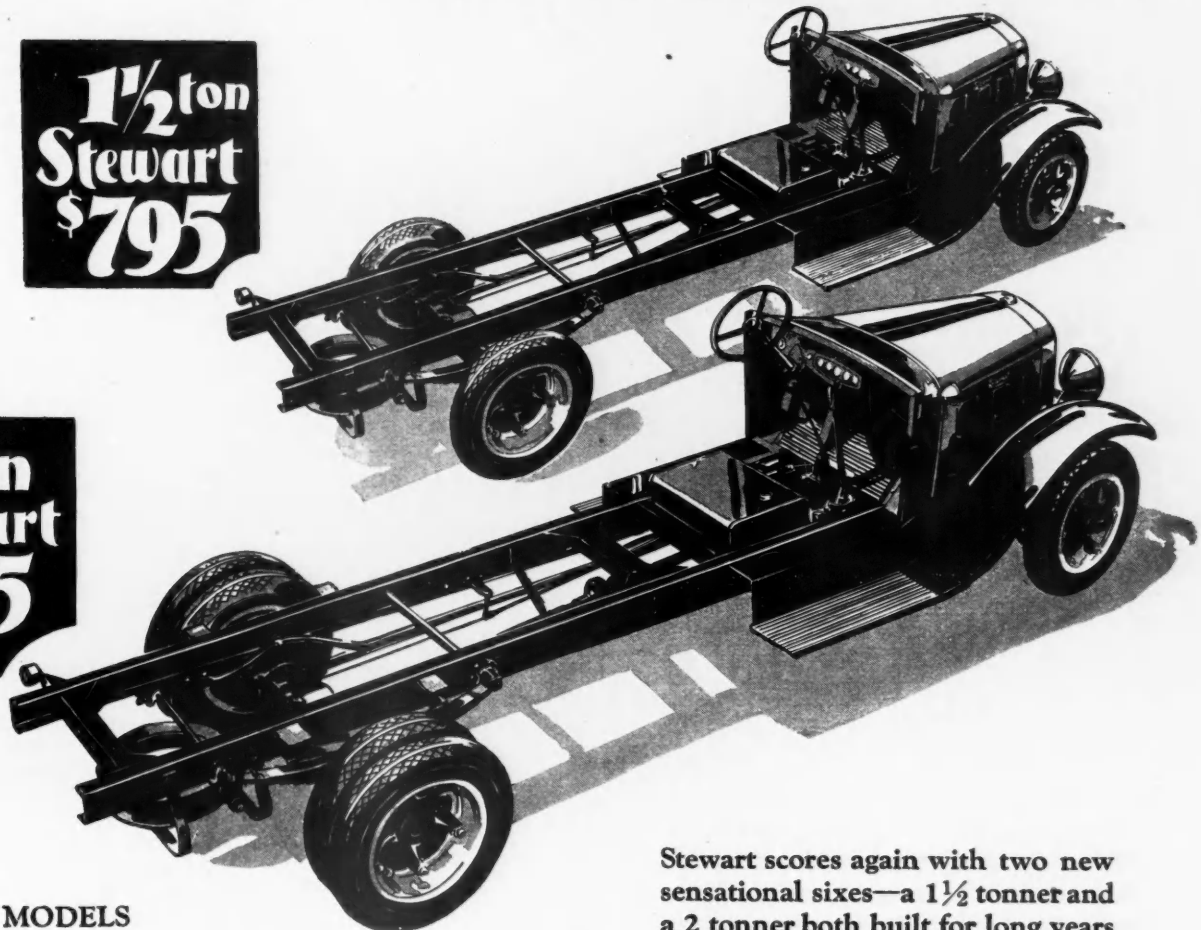
The commission submitted a resolution covering taxation. It reviewed the subject in its Rail-Motor Coordination report at some length, but reached no conclusions one way or the other. The subject was declared to be important enough and difficult enough to justify a special investigation, covering not only motor vehicles, but other carriers as well. It is a part of the general subject handled in the report as to whether and to what extent motor and other carriers are receiving direct or indirect government aid, "amounting, in effect, to a subsidy." It would also call for recommendation as to what steps, if any, are necessary to correct the situation with a view to placing competition "on a just and equitable basis."

# 2 NEW STEWART TRIUMPHS

**Honest Trucks-Honestly Rated-Honestly Priced**

**1½ ton  
Stewart  
\$795**

**2 ton  
Stewart  
\$995**



## MODELS Bevel Axle

	Chassis Prices
1 ton, 4 Cylinder.....	\$ 695
1 ton, 6 Cylinder.....	795
1½ ton, 6 Cylinder.....	795
1½ ton, 6 Cylinder.....	995
2 ton, 6 Cylinder.....	995
2 ton, 6 Cylinder.....	1195
2 ton, 6 Cylinder.....	1695
2½ ton, 6 Cylinder.....	1990
2½ ton, 8 Cylinder.....	2390
3 ton, 8 Cylinder.....	2990

## Worm Axle

*3 ton, 6 Cylinder.....	\$2690
*3½ ton, 6 Cylinder.....	3690
*3½ ton, 8 Cylinder.....	3990
*3½ ton, 6 Cylinder.....	3990
*5 ton, 6 Cylinder.....	5190
*7 ton, 6 Cylinder.....	6190

\*Double Reduction or Worm  
Rear Axle Optional

All Prices f.o.b. Buffalo, N. Y.

Stewart scores again with two new sensational sixes—a 1½ tonner and a 2 tonner both built for long years of constant, faithful service. Never in Stewart's history have we been able to offer so much truck for the price.

Like all Stewarts, they have all the latest known worthwhile mechanical improvements plus Stewart time-tested features. Stewart world-wide reputation for long life, low repair bills and less cost to run is now available at these low prices.

# Stewart

**MOTOR TRUCKS**

STEWART MOTOR CORPORATION  
BUFFALO, N. Y.

Cables:  
Stewartruk-Buffalo

Codes: Acme, Bentley's (Complete Phrase)  
Bentley's (Second Phrase), Universal Trade  
Code, A.B.C. 5th Imp. (5 and 10 letter)

**Stewart Trucks have won—By costing less to run**



## An Operator Eyes The Future Truck

CONTINUED FROM PAGE 23

not be used, either with single or double breaker arm, as it requires not only servicing of a high order of accuracy but too frequent servicing. Higher compression ratios will require coils wound for higher voltages, better insulating material and longer insulators. Spark plugs will have to be equipped with coolers and better electrode material.

There has been very little improvement in lighting during the last three years and there's need for plenty. Wiring is under capacity. In fact, I find that with 32-cp. lamps I can improve lighting in most cases by adding a parallel boosting wire from switch to the lamp circuit near the front of the vehicle. Wiring of the future must be coded and of more adequate size. Increased illumination will require 50-cp. lamps, greater capacity switches, wiring and sockets, and more carefully made reflectors. Metal scoop reflectors, providing downward illumination only would help cure the glare hazard. Deflection from upper to lower beam should be made possible either through a foot switch or steering column hand switch. Bulbs must be of universal two-filament construction and lamps of fixed-focus type mounted on more ruggedly braced holders.

### Streamlining

Carburetion is constantly improving but there is still a noticeable acrid odor from exhaust gas of high-power engines. Proper streamlining, especially at the rear, to eliminate trailing eddies of gas, should help more during the next two years on the exhaust gas problem than catalysts or carburetion. To eliminate vapor lock we mount gasoline pumps, tandem auto pulses, on the side opposite to exhaust line and run the loom-insulated gasoline line along the frame side rail to the fuel tank. The line from the pumps, also insulated, is run around in front of the engine to the carburetor, thus exposing very little surface to heat. Loom is used to prevent vibration and breakage. In fact all lines should be encased in loom. Tubing connecting solid or flexible mounted units should be of high grade flexible material and where necessary provide sufficient coils for elasticity. The lines, especially gasoline, should be fastened securely to prevent whipping, yet permitting play within the loom so that vibration will be dampened.

Fuel tank and battery should be mounted from the frame, the latter either inside or outside but preferably outside. The fuel tank should be of very heavy material and located so that accidental discharge on exhaust lines will not cause fire. Location of tank in cab is probably best but should be fillable from outside of cab, with vent inside and under the cab.

### Drive Units

Before 1935 we shall again be in the class of old "Quads" with constant-mesh gears, silent-belt drive and vacuum-operated shifting. But whatever the method of shift, the old stick must be right handy in case of an emergency. If constant-mesh transmissions are used with dog-shifting and speed-regulating collars it would be easier than ever to shift with a lever in case the operating mechanism went out. I see no reason why a vacuum-operated clutch, controlled by foot, should not be developed, provided conventional operation also is provided. I can't see free wheeling for trucks except possibly in light-duty models. Even vacuum-operated automatic clutches should provide actuation of the mechanism through the pedal in case vacuum fails.

### Brakes

Many things are liable to happen in braking systems before 1935. Use of air is on the increase. In fact, I am inclined to favor air, provided each shoe or pair of shoes is operated by a separate diaphragm. The electric brake, however, on account of its instantaneous action and release and freedom from change on account of bent axles, etc., may represent stiff competition to other systems by 1935, although there are still a few wrinkles to be ironed out in this system. On the other hand, general strengthening of the hydraulic system and utilization of boosters may render both the air and magnetic systems less important than they would otherwise be.

Increasing use of air, vacuum and electricity as actuating forces leads me to believe that engineers of the future will agree upon one of these means to control all power-operated units. Thus, if air is used for brakes it may be utilized for clutch operation and windshield wiper, and it doesn't require much imagination to see mounted on the transmission cover a mechanism using air to shift gears, with the conventional shift lever on hand for emergencies. The same holds in case electricity is used for the brakes. Vacuum control comes as an auxiliary to hydraulic braking.

Hand brakes, for reasons of safety, must be more than just parking brakes and must be capable of holding the truck under full load conditions. Many present hand brakes provide too little surface for emergency service and, possible driveshaft breakage nullifies the driveshaft position.

### Alloy

There is a decided trend toward use of light alloys in chassis parts. Light alloys of thicker and deeper section for rear axle housings, transmission cases and engine blocks, bases and heads will come into use rapidly. Manufacturers are making great progress in developing alloy shapes and formed sheets, which will make building of alloy bodies and frames a matter of assembly. While use of alloy aluminum in cabs, hoods, fenders

and running boards is attractive, it should be remembered that while dural-aluminum has about the same weight as cheap steel of the same tensile strength, the elastic limit is a third less, while a high grade of stainless steel, weight for weight, may have an elastic weight twice or three times that of aluminum alloy. The parts mentioned are among those which have a high rate of mortality because of vibration and a low elastic limit.

Generally speaking, I would say that the rule of using sufficient quantity and section of light alloy to equal elastic limit of the material replaced will work out satisfactorily. Sections, of course, will be larger, but heat (as in the case of rear axle housings) will be conducted away more rapidly and the unit will possess a greater factor of safety.

### Instruments

I can see no reason why a satisfactory magnetic speedometer without shafts and gears cannot be used. Dissatisfaction with drive speedometers in heavy-duty trucks is due mainly to length of the shaft and the fact the gears are too frail. Speedometers should incorporate a recording mechanism that would show time between stops, speed at all times and roughness of highways. In fact, a direct-reading indicator of this sort might be mounted further back on the chassis to indicate flat tires or broken springs immediately. This same device could be applied to trailers, messages being transmitted electrically or magnetically to the cab. This indicator idea could be carried still further by a needle arrangement mounted in cab to reveal immediately that a truck was being operated too rapidly over a rough road or that there was some other trouble causing excessive vibration.

### Cabs

Cabs will be constructed more ruggedly and with outside and inside paneling—single sheeting is not sufficient. By doubling up, the tendency for spreading at doors, accompanied by rattles and sagging, extreme heat in summer and cold in winter would be greatly reduced. I fully expect to see greater use of shatterproof glass all around, framed to slope inward toward the top to eliminate glare.

### Tires

Use of ultra-balloon tires on certain classes of trucks will be in evidence during the next three years, but manufacturers will find that operators will use higher pressures on front than those recommended in order to secure easier steering. The ultimate objective in springing and tire specification should be proper balance and easy steering, because if these are attained lots of evils connected with upkeep of fast road equipment will be eliminated. I believe that efforts along this line will be noted as early as the present year.

## FORD AA TRUCK OWNERS

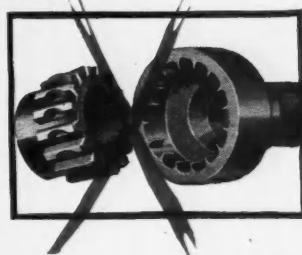
Here's a New Universal Joint and Shaft Assembly—Lasts 2 to 3 Times as Long—No Lay-Ups, Reduces Maintenance Costs \* \* \* \*

**T**HIS new Almetal unit is for Ford AA Trucks built after August 1, 1929. The new 1932 Ford Truck uses the same efficient type joint consisting of a two-joint installation. The Almetal assembly consists of a front joint, a TUBULAR shaft to eliminate weight and "whipping," and a housing, as illustrated. Complete assembly individually boxed. No cutting, welding or machine work to install. No additional holes or changes in frame required. Installation time same as for obsolete gear coupling.

NOTE: FRONT Almetal Joint (illustrated) is of flange type (split design) to permit removal of transmission without shoving back rear axle.

LIST  
**\$1180**  
Complete  
for  
131" W.B.

LIST  
**\$1280**  
Complete  
for  
157" W.B.



**THIS CONDITION  
COSTS YOU MONEY**

Tremendous motor torque, plus large brakes, places a load on the coupling located behind the Ford transmission (especially with overloaded trucks) causing excessive bearing pressure on the now obsolete coupling teeth shown above. This condition makes it practically impossible for even a "film" of grease to penetrate between the teeth, allowing a metal-to-metal contact, which results in quick wear and many replacements. Investigation shows trucks driven 25,000 miles have had the old coupling shaft replaced from three to five times. A fleet of 19 trucks (no truck overloaded) showed installation of 26 coupling shafts in 1931 with no truck in the fleet over 1½ years old. Almetal Universal Joints eliminate costly replacement records such as this for you.

**BUY THRU YOUR  
JOBBER NEAR YOU  
AND SAVE . . . .**

# ALMETAL JOINTS



Complete line of "Almetal" Factory Duplicate Joints for Ford and Chevrolet Cars and Trucks also available



### • SEND FOR THESE •

THE ALMETAL UNIVERSAL JOINT CO., F-4  
1553 East 55th Street, Cleveland, Ohio  
Please send descriptive folder and further details on new Almetal Universal Joint and Shaft Assembly for Ford AA Trucks.

Company Name \_\_\_\_\_

Street Address \_\_\_\_\_

City \_\_\_\_\_

State \_\_\_\_\_

Attention of \_\_\_\_\_



## Just How Much Gaff Can E.P. Lubricants Stand?

CONTINUED FROM PAGE 24

these extreme pressure lubricants are used; and that under conditions where conventional oils and greases are satisfactory, nothing is to be gained by using extreme pressure lubricants.

But so far it is equally convinced that no adequate measuring stick exists by which these properties can be evaluated quantitatively and accurately. Hence, the importance of the constructive program now being put into motion.

The immense practical importance of this whole project becomes evident when this new program is projected on the background of pressing technical problems from which the committee and its work sprang originally about a year ago.

### Severe Duty

Increased engine power and the desire for weight reduction have been bringing axle gear tooth loading steadily nearer a point where conventional types of gear lubricant cannot be expected to give adequate protection against scuffing or rapid wear. With some designs like the hypoid and in motor trucks and buses subjected to overloading and very severe service, it has been clearly indicated that special types of lubricant are essential. Such products have been on the market for some time. Because of their exceptional load-carrying ability they have come to be known as "Extreme Pressure" or "E.P." lubricants.

With the earliest use of these products it was obvious to both producer and user that some method of determining whether or not they possessed the desired degree of load-carrying ability, must be devised since the conventional method of laboratory analysis gave little or no information regarding this all-important property. From a practical standpoint the simplest and most convenient procedure was to try the lubricants in the units for which they were needed, using various methods of overloading the gears and accelerating the test work.

### Wide Variations

Such tests had the merit of approximating service conditions to a degree depending upon the procedure followed. This varied widely, some manufacturers applying very severe shock loads, while others called for prolonged running with loads equivalent to full engine torque. The Gleason method for hypoid gears is a well-known example of the latter type.

All such tests have been open to the very serious objection that they were costly to conduct. Moreover, when the lubricant failed, a set of gears was ruined and even if the test was successful the subsequent use of the gears for production was open to question. Finally, it was difficult if not impossible to draw from one set of test re-

sults satisfactory conclusions regarding the suitability of a given lubricant for a different set of conditions.

In order to avoid these objections and to reduce the time required for testing a lubricant, a number of different types of special test machines have been built by concerns interested in the problem. The best known of these are the General Motors Abrasion Test Machine and the Timken Roller Bearing Co.'s Oil Testing Machine.

The most outstanding fact developed by comparison of the results obtained with the various test machines using identical lubricants is that there is an astonishing lack of agreement between machines in the rating of individual products. Further, the divergence in results is even more marked when service experience is taken into consideration. On one machine a given lubricant may pass and give good results in service, while on another machine it may fail. Some lubricants fail in service yet appear to be satisfactory, based on test machine results.

In brief it may be said that today there is no test machine or method available which will rate correctly the E.P. characteristics of all of the different types of lubricant as shown by their performance in service.

Other properties of E.P. lubricants are important and there is a wide divergence of opinion regarding suitable methods of evaluating them.

## Uniform Legislation Held Key to Full Reciprocity

CONTINUED FROM PAGE 33

With respect to the difficulties confronting wider reciprocity between states, Mr. MacDonald pointed out that:

"We should take a long step forward if clear understanding could be reached of exactly what we mean when we say 'truck' or 'bus,' tractor, or trailer, or semi-trailer; single unit or combination of vehicles. Similarly, we need exact definitions of the terms 'privately owned and operated,' 'common carrier,' 'leased truck' and 'contract carrier.' Likewise, of 'interstate operation' and 'intrastate operation,' of 'resident' and 'non-resident.' Legal decisions will help us here, and the Uniform Code offers an invaluable guide on many of these points. But my point is that there is no real agreement today on many of these commonly used terms."

Mr. MacDonald pointed out that there is general agreement on a maximum overall width of vehicle, loaded or unloaded, of 96 in. Thirty-nine states already fix the width limit at this figure, which indicates that there will be little dispute on this point. He said it seemed desirable to grant some form of special permission to cover a changeover from solid tires to pneumatics, or from single wheels to

dual wheels, which would necessitate an allowance possibly of not more than 102 in. when measured from outside to outside of dual pneumatic tires.

"Minimum maximum" height, he suggested, should be 12 ft., made necessary by the clearance limits of many bridges and underpasses and other overhead structures. This is the limit recommended in the Uniform Code, and it has been adopted in eight states.

"I believe," he said, "that the length of a single vehicle should not exceed 35 ft. The limit fixed by the Uniform Motor Vehicle Code is 33 ft. There are certain advantages to the motor industry in the additional 2 ft., and it is my judgment that highway officials will not object to the 35-ft. standard."

### Lacks Explicitness

"The length recommended by the Joint Highway Transport Committee for a combination of vehicles is 65 ft., and this adjustment was apparently arrived at with the expectation that a trailer would appear in the combination. The Uniform Motor Vehicle Code recommends 85 ft., and many states have reduced the length to a variety of figures running as low as 40 ft., indicating a diversity of opinion."

"An adjustment of an important definition may help us to a decision regarding this question. If a tractor with semi-trailer is to be considered as a single unit and trailers are to be permitted, 65 ft. is undoubtedly the necessary length for an economical combination of vehicles. If, however, a tractor with semi-trailer is itself to be considered a combination of vehicles, 65 ft. is then an excessive and probable dangerous length to permit, and we should be justified in reducing the length in a combination of vehicles to 50 ft. This would permit the use of a tractor and semi-trailer or of a truck and trailer."

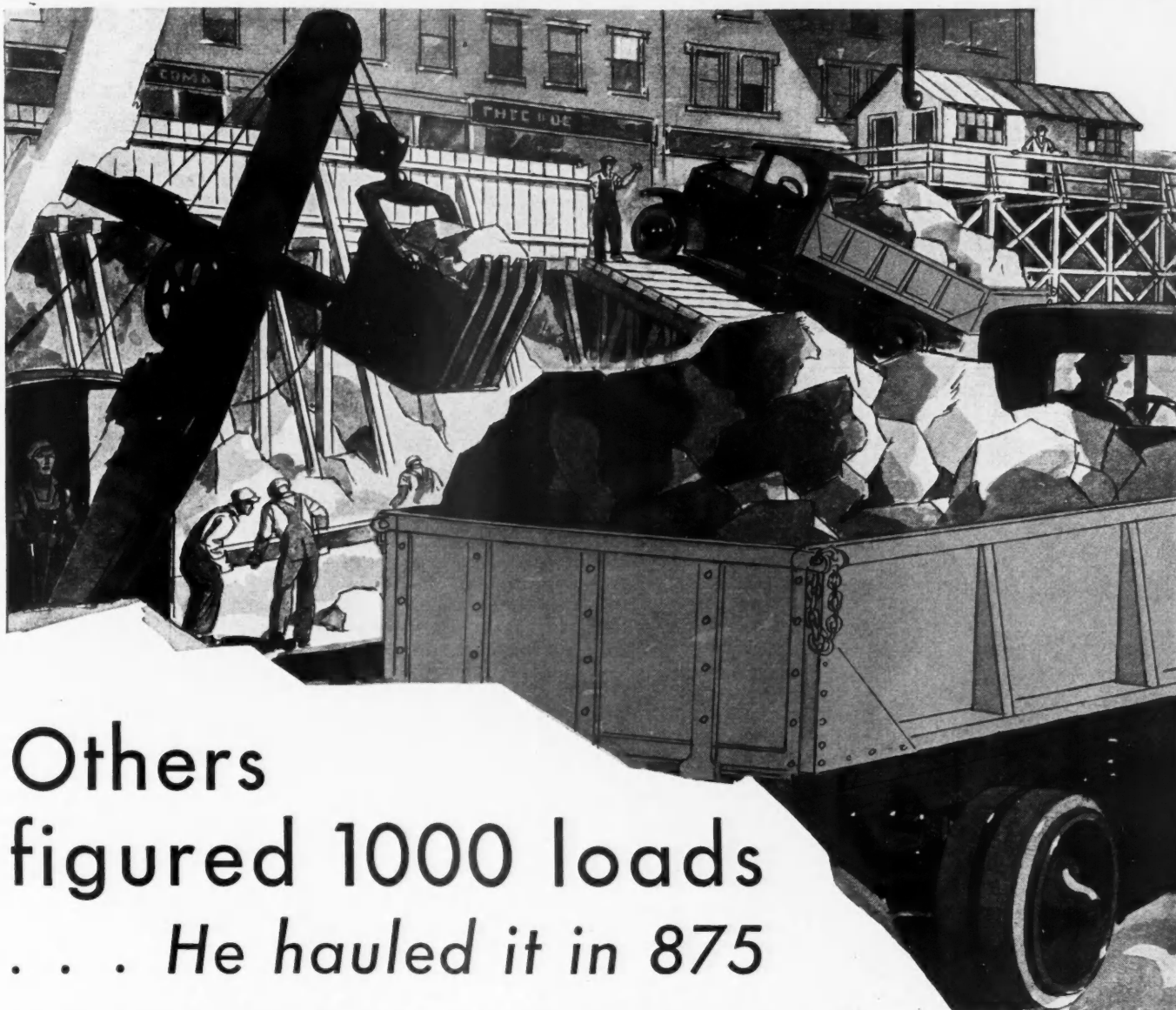
### Axle Loads

"If we hereafter limit truck and bus traffic to the use of high-pressure pneumatic tires, an axle load of 16,000 lb. is satisfactory both to the motor vehicle industry and to the highway builder. If balloon tires are used, 18,000 lb. per axle may be allowed."

"The use of the pneumatic tire must, however, be emphasized in this connection, and I feel from the very definite results of tests made by bureau engineers that regulating authorities would be fully justified if solid tires were entirely ruled off the public highways except only under special permit to meet a few strictly localized conditions as, for instance, in municipalities, that would in no wise have a general effect on motor transport operations."

Following the Washington conference, in accordance with Mr. Eynon's resolution a committee of administrators was appointed to contact motor vehicle manufacturers.





## Others figured 1000 loads ... He hauled it in 875

No, the others weren't wrong in their figuring. But this smart truck operator stole a base on them. He cut down the weight of his trucks by equipping them with bodies made of the light, strong alloys of Alcoa Aluminum. Thus he carried more payload every trip without adding to the total gross weight of his trucks. He hauled 9 cubic yards of "dump material" for every 8 cubic yards that the others did. And, his trucks, with their Alcoa Aluminum bodies hauled these increased loads without a red cent of extra expense per load.

You can make such savings by using Alcoa Aluminum alloys, for they are as strong as structural steel yet weigh only  $\frac{1}{3}$  as much. Structural shapes and sheets of Alcoa Aluminum, from which truck bodies are made, are carried in stock. Also plates, rivets, bolts and screws.

Write for the booklet, "Alcoa Aluminum for Truck Bodies." It shows details of construction. Address ALUMINUM COMPANY of AMERICA; 2439 Oliver Building, PITTSBURGH, PENNSYLVANIA.



# ALCOA ALUMINUM

## S. A. E. Expected to Solve Formula Puzzle

CONTINUED FROM PAGE 27

constant." The factor is expressed as

$$PF = \frac{33,750 \times \text{brake hp.}}{\text{gross vehicle weight}}$$

or  $PF = \frac{\text{Speed in m.p.h.}}{\text{grade} + 100 \times \text{Road Factor}}$  (Per cent grade + 100 × Road Factor)

For a vehicle with 20,000 lb. gross weight, 104 hp. at 2500 r.p.m. rear axle ratio 8.00 and 9.75/20 tires, the performance factor is the simple figure 175. More figuring with the formula shows that the vehicle can climb a 4 per cent grade at 35 m.p.h.

Mathematicians enjoy working out variations of formulas, and the truck rating formulas will give them ample opportunity to have a good time. A point not to be overlooked is the fact that those who favor one formula, those who favor a second and those who favor a third, or even a fourth, all favor rating by formula. For contrast it may be recalled that at the start of the committee's work there were many who doubted that any majority would ever agree upon any method of rating.

Formula rating, either of grade ability with a separate speed figure or an inclusive figure as proposed by Horine, leaves nothing to individual judgment. The answer is calculated from known facts. There is room for individual judgment in the manufacturer's figure for vehicle gross weight as A. G. Hereshoff, Dodge, points out. "The manufacturer in specifying the largest tire size has committed himself in the eyes of the operator to the maximum gross weight the vehicle can haul. \* \* \* As long as engineers are capable of exercising independent judgment, there will be differences in their product. \* \* \* This is not a matter of rating but rather a question of policy for the manufacturer to decide according to his conception of what is right and equitable and has no bearing whatsoever on the official rating."

With manufacturers given some freedom to decide and the engineers and slide rule experts in a cooperative mood the conference in Room C of the hotel at White Sulphur Springs may bring forth a noteworthy decision.

## Scrap the Specifications, But Make Sure Oil's Oily

CONTINUED FROM PAGE 25

reached, the plug is pulled and oil permitted to run out and into a 60 cc. flask, which is graduated for the Saybolt instrument. The time in seconds required to fill the flask up to its graduated mark is noted. Thus, if oil at 100 deg. Fahr. takes 3 minutes and 25 seconds to fill the flask, viscosity of that oil would be quoted at "205 seconds Saybolt at 100 deg. Fahr." The Society of Automotive Engineers motor oils specifications quote viscosities at 130 deg. Fahr., in-

stead of 100 deg. By taking viscosity of an oil at various temperatures, a series of points is obtained through which a viscosity curve is drawn.

Oils of the same viscosity can be made from either asphalt base crude or Pennsylvania crude, and yet their lubricating values will differ greatly. Therefore, viscosity readings do not mean much except to the experienced lubrication engineer, and to the oil refiner as a check on uniformity of his product.

Viscosity is useful as an indicator of internal friction, as a thick oil will have greater internal friction than a thin oil. But here again it means nothing unless taken at the temperature at which the oil is to be used. Anyone can see the folly of buying an oil whose viscosity is a certain amount at 100 deg. Fahr. when the oil is to be used at a higher or lower temperature.

Viscosity curves of different oils will be found to vary greatly. The viscosity curve of an oil sometimes remains fairly flat through a temperature rise of 10 or even 25 deg. and then may fall away very rapidly. It is desirable to have the curve as uniform as possible throughout the temperature range.

Flash test of an oil indicates the temperature to which an oil must be heated to free enough vapor to flash, or momentarily ignite, when it is subjected to an open flame. In testing oil for its flash point, the oil is gradually heated and at each few degrees rise of temperature a small flame is applied to the surface of the oil for a few seconds. As soon as the oil flashes, this temperature is taken as its flash point.

The fire test of an oil is that temperature, usually 25 to 75 deg. Fahr. (14 to 42 deg. C.) above the flash point, at which the oil gives off sufficient vapor to burn steadily if subjected to an open flame. Flash and fire tests are usually given a great deal of attention when oil is to be subjected to service at high temperatures. Flash and fire tests are taken at atmospheric pressure and an open flame is brought into contact with the oil. Therefore laboratory tests usually mean little so far as the suitability of the oil for a given service is concerned.

Cold test of an oil, which is made much of, is useful only in case the oil is liable to be subjected to low temperatures, which would tend to congeal an oil if it did not have a sufficiently low cold test. The cold test is sometimes called the pour test and simply indicates the lowest temperature at which the oil will flow.

The lowest cold test obtainable with pure Pennsylvania crude is about 25 deg. Fahr. (minus 3.9 deg. C.) There are only two commercial methods of reducing the cold test of these Pennsylvania oils: by dewaxing or by adding Parafflow. Investigation and research have shown that dewaxing Pennsylvania oils to the extent of

giving them zero Fahr. cold test is detrimental to their lubricating value. This is perfectly natural since Pennsylvania oils derive a part of their lubricating value from the paraffine. This fact is frequently overlooked by users, who specify both Pennsylvania oil and a zero test.

Experience has proved that there is a specific point down to which Pennsylvania oil can be dewaxed without injury and that if carried beyond this critical point lubricating value decreases in direct proportion to the extent of dewaxing. Introduction of the Parafflow method of reducing cold test in Pennsylvania oils has again brought to the fore the question of low cold test in Pennsylvania oils. Parafflow is a substance which, when added to Pennsylvania oils, renders paraffine wax inoperative at low temperatures. But here again we doubt very seriously, and on the same grounds as we distrusted the dewaxing process, the advisability of tampering with the wax content of Pennsylvania oils.

To make a cold test of oil is simple. A small glass jar, approximately 1½ in. in diameter and about 5 in. long, is filled with oil to a depth of about 1½ in. The top of this jar is closed with a tightly fitting cork. A thermometer carried through the cork dips into the oil about ¾ in. The jar is placed in a metal jacket and put into a freezing mixture. The jar is withdrawn from the freezing mixture at every drop of 5 deg. and tipped into a horizontal position. If the oil flows the jar is replaced into the freezing mixture. This schedule is repeated at each 5-deg. drop of temperature until the oil no longer flows. To be on the safe side the cold test is taken as 5 deg. above that temperature at which the oil ceased to flow.

Obviously none of these tests indicates directly to what extent an oil prevents metallic contact and reduces friction between moving parts, which, after all, is the purpose of oil.

## Do Diesels Have a Chance Against Gasoline Engines?

CONTINUED FROM PAGE 36

sure ignition during the first few cycles, and the question of starting may thereby be relegated to a position of secondary importance as compared with other considerations. The means of supplying this additional heat usually takes the form of electrically heated 'glow plugs' or some form of cartridge. In some designs the provision of means for temporarily increasing the compression ratio has been successfully employed, a ratio of about 20:1 being used for this purpose."

In the final analysis all comparisons will have to be made on the basis of the best product of the Diesel engineer's art (now in the making) weighed against the gasoline engine with its background of over 25 years of constant improvement.



*Now!*

**White  
AND  
INDIANA**

THE  
**MOST  
PROFITABLE  
FRANCHISE**

**IN THE TRUCK INDUSTRY**

**JUST ANNOUNCED**  
**New INDIANA**  
**SERIES 85**  
**10,000 Lbs. GROSS**  
**\$ 885**  
**chassis at factory**

The new Indiana Series 85 is the outstanding value in the 1½-ton All-Truck field. A few of its features include: 68 H. P. Performance—6-Cylinder Power, Speed and Flexibility—Low Price—4-Wheel Hydraulic Brakes—7-Bearing Crankshaft—Five Available Wheelbases—Truck Type Tires, Heavy Duty Rims—Chassis Weight 3,900 Pounds, Proof of All-Truck Construction—World Wide Service.

Study the 10 White-Indiana points of advantage listed below—each separately a powerful attraction—all, taken together, the surest sales and profit opportunity for Dealers in the motor truck and coach industry.

The White and Indiana lines go beyond any competitor in covering the price and quality markets, from \$885 up. You handle products established in public preference by many years of performance—you have a lower-cost time payment plan, more liberal credit support—you work with the fullest national and local advertising support—you get factory service on parts and individual sales assistance from the nearest White Factory Branch—you profit from national sales and service.

These are some of the advantages that mean more sales, more profits—increased local prestige and business soundness throughout the years—for White and Indiana dealers.

A few territories are still available. Get the full facts *now* on the new White and Indiana Dealer Franchise. Write or wire The White Company, Cleveland.

**ONLY WHITE AND INDIANA DEALERS HAVE  
ALL THESE ADVANTAGES:**

- 1. MORE PROFITS IN 1932**  
The practical opportunity to make more sales—be in on more deals—both trucks and coaches.
- 2. STABILITY AND LEADERSHIP OF COMPANIES**  
Now, more than ever, the support of strong, established companies is necessary to permanent business—and you can figure the added advantage of 70% repeat business to be expected from White and Indiana sales.
- 3. COMPLETE LINE**  
The widest range of models and prices in the industry—a truck or coach for every buyer—from the lowest priced to the highest quality.
- 4. GREATEST VALUE**  
Every truck chassis All-Truck—designed and built specifically for Truck work—no compromise—cannot be equaled, point for point and dollar for dollar.
- 5. WORLD-WIDE SERVICE**  
The White and Indiana Dealer is a link in a world-wide service system. He is in line for profitable business from long distance operators passing through his territory. World-Wide Service also helps the Dealer to make sales, particularly to cross-country operators.
- 6. LIBERAL DISCOUNT**  
You have only to ask our representative for the details.
- 7. PARTS AND REPAIRS PROFITS**  
Genuine White and Indiana parts are sold to dealers at a discount, assuring you profitable volume with a low inventory, due to the accessibility of branch parts stock.
- 8. BETTER DEALER FLOOR PLAN**  
Only 10% down for 90 days—through the White Motor Securities Corporation.
- 9. LOWER FINANCE CHARGE**  
Time payments at less cost to customers—through the White Motor Securities Corporation—handling your time paper. Your capital is freed for local operations.
- 10. SALES ASSISTANCE**  
Individual sales assistance or counsel—always immediately available—from your nearby White Branch—when you call for it.

**THE ONE FRANCHISE THAT DOES NOT FORGET THAT THE DEALER MUST PROFIT**



## A Member of Congress Answers the Railroads

CONTINUED FROM PAGE 37

I find the people you pay by the day are paid \$8.53 per day and the people you pay by the hour are paid 64 cents per hour.

Your railroads run through the farms of the nation and the wage there is \$1.35 per day for ten hours. I do not have the wage scale for other people for whom you haul goods, but just how long can the farmer on a wage scale of 13½ cents per hour pay the one who hauls his product at least 64 cents an hour, and if there is a cheaper means of transportation shall we take it away from him by regulation?

The railroads of the country are paying out some \$400,000,000 a year for executives, officials and professional men and their assistants who run the railroads.

In addition, the railroads have an expensive lobby operating in every state in the Union, in order to maintain your advantages, spending many millions of dollars which contribute to your high rates.

At the same time the government is spending \$9,000,000 a year on the Interstate Commerce Commission and it does, in my mind, the most important work relative to the railroads because it decides the rates you are to charge for your services and the Board of Mediation finally decides the wages you are to pay and the government itself decides the hours of labor. The work left to you is a matter of keeping the records and operating the railroads. Certainly the need for high-salaried men is reduced by these circumstances.

You are unfortunate in having most of your supplies produced by the steel plants where the wage scale and salary standards are similar to the railroads. Your cars are steel and your rails are steel.

Is not an adjustment absolutely necessary? Higher rates for you bring diminishing returns. Forcing natural competition to accept your rates is certainly unfair to the people of the country. The railroad people are on a platform above other people as a rule, and you receive for your services more than the traffic will bear. You receive more than your share of the value of a delivered article. You are out of line with general conditions, and to my mind there is no real remedy except for you to go "potluck" with all the people.

Railroad men admit there is no way to haul goods as cheaply as on two steel rails and the reason you fail is because your entire business expense structure is away above the general condition of those for whom you haul goods.

There are other lines that are trying to continue on a platform artificially raised above the general level, and an adjustment is necessary in order that a fair exchange of com-

modities may proceed, or, in other words, this adjustment must take place before the ordinary flow of business is resumed in the United States.

Very truly yours,

CHARLES BRAND.

## Will Motor Trucks Roll Around on More Rubber?

CONTINUED FROM PAGE 26

heavy loads is one of the major difficulties to be overcome, according to a tire company executive who says, "One of the biggest drawbacks I see is the 96 in. width restriction. A tire of this type to carry the loads required by a fair-sized truck would require so large a cross section that there would not be room left for frame."

Comparisons, based upon Tire & Rim Association standards, show that extra low pressure tires in heavy duty truck sizes will be some doughnuts. Starting with the 9.00/16 tire carrying 24 lb. pressure, previously mentioned, we find that a 6.50/20 truck balloon inflated to 50 lb. pressure is rated to carry an equivalent load, 1650 lb. A truck balloon tire of the same cross section—a 9.00/20—inflated to 55 lb. is rated to carry practically twice as much as the extra low pressure 9.00/16. Imagine the size of extra low pressure tire required to carry 3250 lb., which is the rated capacity of the 9.00/20 just mentioned. Extra low pressure tires of the near future may carry loads of two to three ton trucks; but when it comes to 7½ to 10 tonners—try to put four 20 in. tires and two springs and a 34-frame and an axle within 96 in. This puzzle will not be solved overnight.

The new type balloons, because of their large dimensions for a given carrying capacity, possess better "floatation" qualities which are an advantage in certain truck operations. Reduced pressure, per square inch, on the ground and greater ground contact area increase a truck's ability to go through sand and mud, to traverse ditches and travel across country. Erecting high tension and telephone lines away from beaten paths and oil field work are two examples of such service. That tires of large cross section confer cross-country ability upon motor vehicles was amply demonstrated several years ago by the Army Ordnance Department at Aberdeen, Md., in tests of Model T Fords equipped with airplane wheels.

Brakes are a major problem in truck design because there is so little space within, or beside, 20-in. wheels. Where brake drums can be placed on trucks carrying extra low pressure tires, especially dual rear equipment, is an unanswered question. Designers are working on this and other problems connected with lower pressure tires on trucks. Front end layout and steering are not being overlooked. Turning front wheels all the way to right or left as for parking involves a few little problems of its own.

## Utility Cuts Parts Cost With Salvage

CONTINUED FROM PAGE 35

fourth spark plug holes, hold the head at correct height. Long set screws in the angles are forced against sides of the head, making the whole assembly rigid.

### Fig. 6—Mack Clutch Drums

Clutch drums in which holes are worn by round ends of levers are reclaimed for further service by bushing the holes. Bushings are made of tool steel and measure 11/16 in. outside diameter. After the first rebushing job it is not necessary to bore the drum again; bushings are driven out and replaced with others.

## General

### Fig. 7—Winch Drum

When line crews asked for larger drums, for pulling cable, than the usual truck winch capstans, the shop responded with an attachment for mounting a standard Ford truck wheel on the end of the capstan. The attachment resembles a rear wheel hub (Fig. 7A) and carries special studs threaded for Ford wheel nuts and spaced to match the wheel (Fig. 7B). End of the capstan is counterbored, attachment pressed into place and then welded.

### Fig. 8—Windshield Cleaner Test

Windshield cleaners are tested on the bench after repairs to avoid loss of time from comebacks. The shop does not have a vacuum line (few shops do) and vacuum is obtained from compressed air by an ingenious ejector.

A blast of air in a copper tube connected to an air hose induces a vacuum in a smaller tube inserted in the larger tube and bent along the tube axis. End of the small tube is connected to the cleaner by a rubber hose. The cross tube is simply a brace.

### Fig. 9—Driveshaft Flange Puller

A modified driveshaft flange pulls flanges from shaft. A heavy screw through the center (Figs. 9A and 9B) applies pressure to the shaft end after the flange and puller are bolted together by bolts used in original assembly.

### Fig. 10—Trailer Hitch

Spring type trailer hitches, made in the shop, have given satisfactory service in spite of severe strains. The mounting bracket may be bolted to frame or cross member either in position on one side, as shown in accompanying photo, or with spring at the bottom. The center pin which is 1 in. in diameter slides in sleeves at each end. A washer and lock nuts take up pull when spring is fully compressed. A cross pin has a coil spring to keep the tool steel lock in place.

# "Can I Lower My Brake Costs?"

## Here is The Way To Answer Your Own Question

Perhaps you, like most other truck operating men, have asked yourself this question. And you are the only one who can answer it accurately. Another operator's brake costs are no safe barometer for your own. Your conditions are different. His brake costs may be higher and yet it may be possible to make drastic reductions in yours.

Yes, you must answer your own question! But you can't hope to find the correct answer until you have the facts. And the only sure way of securing these facts is to conduct your own tests, on your own trucks.

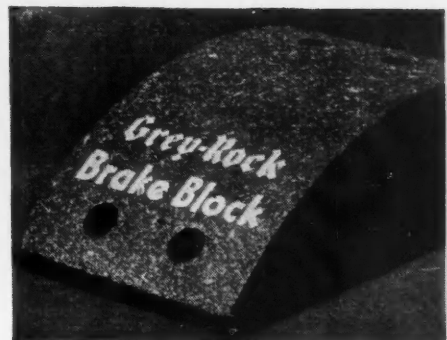
Make comparative brake lining tests and keep accurate records of performance and costs. They will show you definitely whether or not your brake costs can be reduced and how to make the reduction.

Be sure to include a Grey-Rock Brake Lining in your tests—either Grey-Rock Industro-Truck (a woven lining) or Grey-Rock Brake Blocks—whichever type your

trucks require. One or the other of these famous Grey-Rock heavy duty linings has helped many an operator to reduce his brake costs, as the result of comparative tests.

If lowering your brake costs is of importance to you we urge that you adopt this sensible method of doing it. We'll be glad to give our assistance. Write to us.

UNITED STATES ASBESTOS  
DIVISION of Raybestos-Man-  
hattan, Inc., MANHEIM, P.A.





# COMMERCIAL CAR JOURNAL'S

CORRECTIONS ARE MADE EACH MONTH FROM DATA SUPPLIED DIRECT BY TRUCK MAKERS +

Line Number	MAKE AND MODEL	GENERAL (See Keynote)					TIRE SIZE		MAJOR UNITS					FRAME			
		Tonnage Rating	Chassis Price	Standard Wheelbase	Max. W. B. Furnished	Gross Vehicle Weight	Chassis Wt. (Stripped)	Front	Rear	ENGINE		TRANSMISSION		REAR AXLE			
										Make and Model	No. of Cylinders Bore and Stroke	Make and Model	Location and Forward Speeds	Make and Model	Gear and Type		
																Drive and Torque	GEAR RATIOS
1	A.C.F.	1606	6950	186	222	23600	10170	B9.75/22	B9.75/22	Has 160	6-4 1/2 x 5 1/2	BL 1714	U4 Op	Tim 76730	2F	R 7.46 52.7 8x3	P
2	175B	6 1/2	8300	186	222	24300	10750	B10.50/22	B10.50/22	Has 175	6-5x6	BL 714	U4 Op	Tim 76730	2F	R 7.46 38.6 8x3	P
3	175A	7 1/2	8800	186	240	28300	11610	B10.50/24	B10.50/24	Has 175	6-5x6	BL 714	U4 Op	Tim 79730	2F	R 7.48 38.7 8x3	P
4	Am. LaF. Big Ch.	15	6725	226	242	24000	10000	P40x8	DP40x8	Ow 16R	6-4 1/2 x 6	Ow 16R	A4 No	Ow 16R	2F	R 6.13 33.0 9 1/2 x 2 1/2	P
5	Armleder	11Ha	1570	156	195	15000	4070	B7.00/20	DB7.00/20	Con 16C	6-3 3/4 x 4 1/2	Fu WOB	U4 No	Tim 53200H	BF	H 5.83 31.2 6x3 1/2	P
6	21Ha	2 1/2-4	2185	160	207	17800	4783	B8.25/20	DB8.25/20	Her WXB	6-3 3/4 x 4 1/2	Fu MLU	U4 No	Tim 54200H	BF	H 6.06 38.5 6x3 1/2	P
7	31Ha	3 1/2-5	2745	146	213	19000	5838	B9.00/20	DB9.00/20	Her WXC	6-4x4 1/2	Fu MGU	U4 No	Tim 56200H	BF	R 6.02 39.2 7x3 1/2	P
8	41Ha	4 1/2-5 1/2	3050	134	227	20000	6600	B9.75/20	DB9.75/20	Her WXC	6-4x4 1/2	Fu MGU	U4 No	Tim 58200H	BF	R 6.83 43.8 7x3 1/2	P
9	61Ha	5-7	3625	134	227	20000	7400	B9.75/20	DB9.75/20	Her WXC2	6-4 1/2 x 4 1/2	Fu MGU	U4 No	Tim 65706H	WF	R 8.5 55.2 8 1/2 x 3 1/2	P
10	71Ha	7-9	4595	138	235	21000	7800	B10.50/20	DB10.50/20	Her YXC	6-4 1/2 x 4 1/2	Fu VUOG	U5 No	Tim 65704H	WF	R 8.5 55.2 8 1/2 x 3 1/2	P
11	TRHA	10	3645	148	174	17000	6250	B9.75/20	DB9.75/20	Her YXC3	6-4 1/2 x 4 1/2	Fu VUOG	U5 No	Tim 58200H	BF	R 7.8 55.1 7x3 1/2	P
12	TRDA	10	3895	148	174	17000	6450	B9.75/20	DB9.75/20	Her YXC3	6-4 1/2 x 4 1/2	Fu VUOG	U5 No	Wls 88374L	2F	R 7.8 56.8 7x3 1/2	P
13	Atterbury	A	1095	132	143	7000	3400	P30x5	P30x5	Lyc WTG	6-3x4 1/2	Wa T9	U4 No	Tim 51000H	B	H 6.20 39.7 5 1/2 x 3 1/2	N
14	K	1 1/2	1595	145	160	8000	3640	P32x6	P32x6	Lyc WTG	6-3x4 1/2	Wa T9	U4 No	Tim 52200H	B	H 6.50 39.7 5 1/2 x 3 1/2	N
15	G	2 1/2	1985	160	160	10000	3955	P32x6	DP32x6	Lyc 48L	6-3 1/4 x 4 1/2	Co F4B	U4 No	Tim 54200H	B	H 6.80 45.1 5 1/2 x 3 1/2	N
16	G	2 1/2-3	2375	175	188	12000	5300	B7.50/20	DB7.50/20	Lyc ASD	6-3 1/4 x 4 1/2	Co W4C	U4 No	Tim 54200H	B	H 6.80 39.8 7x3 1/2	N
17	G	3 1/2-4	2950	189	202	14000	5800	B8.25/20	DB8.25/20	Lyc ASD	6-3 1/4 x 4 1/2	Co W4C	U4 No	Tim 56200H	B	H 7.40 43.3 7x3 1/2	N
18	R	3	3700	173	199	16040	7250	P34x7	DP34x7	Con 18R	6-4x4 1/2	BL 35-4	U4 No	Tim 65001H	WF	H 7.1 37.4 7x3 1/2	N
19	R	3	3150	190	215	16000	6000	B9.00/20	DB9.00/20	Lyc ASD	6-3 1/4 x 4 1/2	Co W4C	U4 No	Tim 58200H	BF	H 7.80 45.6 7x3 1/2	N
20	R	3 1/2-4	4050	209	221	18500	7800	B9.00/20	DB9.00/20	Con 18R	6-4x4 1/2	BL 51-5	U4 No	Tim 65200H	W	R 7.50 40.1 8x3 1/2	N
21	R	4 1/2-5	4650	222	222	23000	8400	B9.75/20	DB9.75/20	Con 20R	6-4 1/2 x 4 1/2	BL 51-5	U5 No	Tim 65720H	W	R 8.50 62.9 8x3 1/2	N
22	R	5-6	4750	186	220	19315	8300	P36x8	DP36x8	Con 20R	6-4 1/2 x 4 1/2	BL 51-5	U4 No	Tim 65706H	WF	R 7.25 38.8 8x3 1/2	N
23	Autocar	100	5675	223	237	28000	9100	B10.50/20	DB10.50/20	Con 21R	6-4 1/2 x 4 1/2	BL 55-7	A7 No	Tim 66720DH	W	R 9.0 85.5 9x3 1/2	N
24	A	1 1/2-2	3200	150	192	11000	5350	B7.00/20	DB7.00/20	Ow 8	6-3 1/4 x 4 1/2	BL 234	U4 No	Ow SA	SF	H 5.22 33.4 6 1/2 x 3 1/2	C
25	A	2 1/2-3	3500	140	192	11000	5400	B8.25/20	DB8.25/20	Ow SD	6-4x4 1/2	Ow D	U5 No	Ow SA	SF	H 5.22 29.7 8x3 1/2	C
26	(Eng. und. seat)	H	4100	141	161	11000	6770	P34x7	DP34x7	Ow M	4-4 1/2 x 5 1/2	Ow T	U4 No	Ow H	2F	H 7.67 48.6 7x2 1/2	C
27	HS	3 1/2-4	4600	141	161	11000	7900	P40x8	DP40x8	Ow M	4-4 1/2 x 5 1/2	Ow T	U4 No	Ow C	2F	H 7.67 48.6 7x2 1/2	C
28	SHS	3 1/2-4	4800	104	161	11000	7900	P40x8	DP40x8	Ow SCH	6-4 1/2 x 4 1/2	Ow T	U4 No	Ow C	2F	H 8.46 53.6 7x2 1/2	C
29	N	3 1/2-4	4600	163	242	11000	7990	B9.75/20	DB9.75/20	Ow SCH	6-4 1/2 x 4 1/2	Ow D	U5 No	Ow N	2F	H 7.12 41.6 8x3 1/2	C
30	SCHS	3 1/2-4	5100	157	203	11000	8180	B9.75/20	DB9.75/20	Ow SCH	6-4 1/2 x 4 1/2	Ow D	U5 No	Ow CG	2F	H 8.57 54.3 9x3 1/2	C
31	TF	6100	6100	192	242	11000	9300	B10.50/20	DB10.50/20	Ow SCM	6-4 1/2 x 4 1/2	Ow T	U4 A3	Ow TG	2F	H 7.20 103 9x3 1/2	C
32	C	5900	5900	172	186	11000	9705	B10.50/24	DB10.50/24	Ow SCM	6-4 1/2 x 4 1/2	Ow B	A4 Op	Ow C	2F	H 8.57 52.5 10 1/2 x 3 1/2	C
33	Available	T12	1325	Op	Op	11000	3850	B6.50/20	B6.50/20	Wau ZK	6-3 1/4 x 4 1/2	BL 714	U4 No	Tim 53200H	SF	H 6.6 42.2 6x2 1/2	P
34	T20	2-2 1/2	1975	Op	Op	13500	5000	B7.00/20	DB7.00/20	Wau TL	6-3 1/4 x 4 1/2	BL 224	U4 No	Tim 54300H	SF	R 6.8 43.5 6x2 1/2	P
35	T23	2 1/2	2195	Op	Op	16000	5800	B7.50/20	DB7.50/20	Wau MS	6-3 1/4 x 4 1/2	BL 314	U4 No	Tim 56200H	SF	R 7.4 48.8 6x2 1/2	P
36	T25	2 1/2-3	2650	Op	Op	17000	6000	B8.25/20	DB8.25/20	Wau MS	6-3 1/4 x 4 1/2	BL 314	U4 No	Tim 56200H	SF	R 7.4 48.8 6x2 1/2	P
37	T30	3	2685	Op	Op	20500	6500	B8.25/20	DB8.25/20	Wau ML	6-4x4 1/2	BL 51	U4 No	Tim 58200H	SF	R 7.8 41.7 7x2 1/2	P
38	T35	3 1/2	3125	Op	Op	20500	7400	B9.00/20	DB9.00/20	Wau MK	6-4 1/2 x 4 1/2	BL 554	U4 No	Tim 58200H	SF	R 7.8 54.5 7x2 1/2	P
39	T39	3 1/2	3650	Op	Op	25500	8000	B9.75/20	DB9.75/20	Wau RL	6-4 1/2 x 5 1/2	BL 615	U5 No	Tim 65720H	WF	R 8.5 66.1 8x3 1/2	P
40	T43	3 1/2-4	4150	Op	Op	25500	8150	B9.75/20	DB9.75/20	Wau RL	6-4 1/2 x 5 1/2	BL 615	A7 No	Tim 65720H	WF	R 8.5 80.7 7x2 1/2	P
41	T45	4	4985	Op	Op	27000	8800	B9.75/20	DB9.75/20	Wau 6AB	6-4 1/2 x 5 1/2	BL 70-7	A7 No	Tim 65720H	WF	R 8.5 80.7 7x2 1/2	P
42	T50	5	5350	Op	Op	33000	9800	B9.75/20	DB9.75/20	Wau 6BR	6-5x5 1/2	BL 714-703	A4 A3	Tim 66720H	WF	R 9.5 90.0 7x2 1/2	P
43	Brockway	80C	1215	149	168	9500	4075	B6.00/20	DB6.00/20	Con 26B	6-3 1/4 x 4 1/2	Wa T9	U4 No	Tim 53200H	SF	H 5.66 36.2 5 1/2 x 3 1/2	C
44	90C	1 1/2-2 1/2	1525	149	168	11500	4355	B6.50/20	DB6.50/20	Con 27B	6-3 1/4 x 4 1/2	Wa T9	U4 No	Tim 54200H	SF	H 5.83 37.4 6 1/2 x 3 1/2	T
45	92C	2	1800	149	168	12500	4540	P32x6	DP32x6	Con 27B	6-3 1/4 x 4 1/2	Wa T9	U4 No	Tim 54200H	SF	R 5.83 37.4 6 1/2 x 3 1/2	T
46	120C	2-3	1990	156	188	15000	5550	P32x6	DP32x6	Con 30B	6-4x4 1/2	BL 314	U4 No	Tim 54300H	SF	H 5.85 38.5 7 1/2 x 3 1/2	T
47	140C	2 1/2-3 1/2	2495	156	200	17500	6100	P32x6	DP32x6	Con 30B	6-4x4 1/2	BL 314	U4 Op	Wls 4916L	2F	H 6.6 43.5 7 1/2 x 3 1/2	T
48	141C	3-4	2935	170	212	19500	6500	P32x6	DP32x6	Con 30B	6-4x4 1/2	BL 314	U4 Op	Wls 69317L	2F	R 7.0 46.2 8x3 1/2	T
49	170C	3-4	3160	170	212	19500	7100	P32x6	DP32x6	Con 33B	6-4 1/2 x 4 1/2	BL 554	U4 Op	Wls 69317L	2F	R 6.41 46.6 8x3 1/2	T
50	175C	3-4	3660	170	224	19500	7200	P34x7	DP34x7	Con 34B	6-4 1/2 x 4 1/2	Fu VUOG	U5 Op	Wls 69317L	2F	R 6.41 46.6 8x3 1/2	T
51	195C	3 1/2-5	3820	170	224	22000	8100	P34x7	DP34x7	Con 33B	6-4 1/2 x 4 1/2	BL 554	U4 Op	Wls 1237H	2F	R 7.2 52.4 8x3 1/2	T
52	220C	5-7	4560	170	224	25000	8675	P36x8	DP36x8	Con 34B	6-4 1/2 x 4 1/2	BL 554	U4 Op	Wls 1627KH	2F	R 6.96 50.7 8x3 1/2	T
53	260C	7-10	5850	212	240	28000	9000	B10.50/22	DB10.50/22	Con 35B	6-4 1/2 x 5 1/2	Fu MHU	U4 Op	Wls 1737KH	2F	R 8.05 50.7 8x3 1/2	T
54	Chevrolet Ind. Com.	1 1/2	355	109	109												



# TRUCK SPECIFICATIONS TABLE

+ FOR MEANING OF ABBREVIATIONS AND EXPLANATION OF REFERENCE MARKS SEE PAGE 70

Line Number	ENGINE DETAILS										FUEL SYST.	ELEC-TRICAL	FRONT AXLE	BRAKES			BODY MOUNT-ING DATA		SPRINGS		Auxiliary Type								
	Piston Displacement	Compression Ratio	Torque lb. ft.	N.A.C.C. Rated H.P.	Max. Brake H.P. at R.P.M. Given	Valve Arrangement	Camshaft Drive	MAIN BEARINGS		Steering Gear Make				SERVICE		Hand Type, Location	Cab to Rear of Frame	Cab to Rear Axle	Width of Frame	Front		Rear							
								Number and Diameter	Length		Make, Location Type, Operation	Lining Area	Drum Material																
1468	4.4	322	43.3	120	2200	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	VDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
2707	4.4	500	60	175	2200	H	C	A 7-3 1/4	14 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
4572	4.5	360	48.6	115	1600	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	VDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
2485	5.0	150	27.3	65	2600	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
2984	4.7	192	33.7	66	2200	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
3394	4.7	225	38.4	73	2300	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
3394	4.7	225	38.4	73	2300	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
9360	4.7	238	40.3	80	2200	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
10428	4.7	280	46	93	2200	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
11478	4.7	318	51.2	103	2200	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
12478	4.7	318	51.2	103	2200	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
13201	5.5	142	21.6	64	2800	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
14201	5.5	142	21.6	64	2800	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
15224	4.9	146	25.3	62	2800	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
16298	5.0	198	33.7	85	3000	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
17298	5.0	198	33.7	85	2800	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
18339	4.6	212	38.4	82	2400	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
19298	5.0	198	33.7	85	2800	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
20339	4.6	212	38.4	82	2400	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
21381	4.5	238	40.3	81	2400	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
22381	4.5	238	40.3	81	2400	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
23428	4.9	268	45.9	101	2400	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
24314	5.2	213	38.4	75	2400	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
25358	5.2	240	38.4	82	2400	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
26358	5.2	240	38.4	82	2400	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
27350	5.1	218	32.4	45	1450	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
28350	5.1	218	32.4	45	1450	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
29405	5.1	221	33.4	45	1450	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
30405	5.1	221	33.4	45	1450	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
31405	5.1	221	33.4	45	1450	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
32455	5.1	221	33.4	45	1450	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
33455	5.1	221	33.4	45	1450	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
34780	4.6	247	66.1	156	1800	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
35221	4.9	144	27.3	63	3000	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
36255	4.6	117	27.3	62	2400	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
37315	4.6	200	33.8	73	2300	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
38315	4.6	200	33.8	73	2300	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
39358	4.6	230	38.4	80	2500	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
40381	4.6	242	40.8	85	2500	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
41462	4.6	305	45.9	102	2400	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
42517	4.5	335	51.3	110	2300	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
43549	4.5	330	48.3	100	2300	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo	Spi	Tim 27451	Ros	O41A	720	A	CD	172	102	33 1/2	42x3	56x4	
44674	4.4	440	60.0	125	1900	H	C	A 7-3 1/4	10 1/2	CC	Ha	Zen	MDR	DR	PBL	Lo													

Line Number	MAKE AND MODEL	GENERAL (See Keynote)				TIRE SIZE		MAJOR UNITS.										FRAME			
		Tonnage Rating	Chassis Price	Standard Wheelbase	Max. W. B. Furnished	Gross Vehicle Weight	Chassis Wt. (Stripped)	Front	Rear	ENGINE		TRANSMISSION		REAR AXLE		Gear and Torque	Drive and Torque	GEAR RATIOS		Side Rail Dimensions	Type
										Make and Model	No. of Cylinders Bore and Stroke	Make and Model	Location and Forward Speeds	Aux. Location and Speeds	Make and Model			Gear and Type	In High		
1	Day Elder(4)	60 1 1/2-2	895	135	156	6000	3300	B6.00/20	B6.50/20	Con 25A	6-3 1/2 x 4	WG T9	U4	No	Tim 53200H	BF	H 5.66	36.3	5 1/2 x 3 1/2 x 4	C	
2	Day Elder(4)	60 1 1/2-2	1395	135	168	8500	3850	B6.00/20	DB6.50/20	Con 16C	6-3 1/2 x 4	WG T9	U4	No	Tim 53200H	BF	H 6.60	42.3	5 1/2 x 3 1/2 x 4	C	
3	Day Elder(4)	60 1 1/2-2	1825	137	199	11000	4800	B7.00/20	DB7.00/20	Con 16C	6-3 1/2 x 4	WG T9	U4	No	Tim 54200H	BF	H 6.80	44.9	5 1/2 x 3 1/2 x 4	C	
4	Day Elder(4)	60 1 1/2-2	2225	157	199	13000	6600	B7.50/20	DB7.50/20	Con 16C	6-4 x 1 1/2	BL 314	U4	No	Tim 56200H	BF	H 6.16	40.7	7 1/2 x 4 1/2	C	
5	Day Elder(4)	60 1 1/2-2	2795	156	204	16000	6800	B7.50/20	DB9.00/20	Con 18R	6-4 x 1 1/2	BL 51	U4	No	Tim 65200H	WF	R 7.75	36.1	9 1/2 x 3 1/2 x 4	C	
6	Day Elder(4)	60 1 1/2-2	3295	156	204	20000	7600	B9.00/20	DB9.00/20	Con 18R	6-4 x 1 1/2	BL 554	U4	No	Tim 65720H	WF	R 7.75	43.5	9 1/2 x 3 1/2 x 4	C	
7	Day Elder(4)	60 1 1/2-2	4295	162	202	24000	9500	P38x9	DP38x9	Con 21R	6-4 x 1 1/2	BL 615	A4	No	Tim 66720H	WF	R 9.50	50.8	10 1/2 x 3 1/2 x 4	C	
8	Diamond T	210 1 1/2	595	135	158	8500	3100	B5.50/20	B6.50/20	Her JXA	6-3 1/2 x 4	WG T9	U4	No	Cla B373E	WF	H 5.67	37.1	6 1/2 x 2 1/2 x 4	T	
9	Diamond T	210 1 1/2	795	137	167	9500	3400	B6.00/20	P32x6	Her JXA	6-3 1/2 x 4	WG T9	U4	No	Cla B410	WF	H 5.67	37.1	6 1/2 x 2 1/2 x 4	T	
10	Diamond T	210 1 1/2	995	137	167	12000	4200	B6.50/20	DB6.50/20	Her JXB	6-3 1/2 x 4	WG T9	U4	No	Cla B613	WF	H 5.67	37.1	6 1/2 x 2 1/2 x 4	T	
11	Diamond T	210 1 1/2	1245	139	171	13500	6100	B7.50/20	DB7.50/20	Her WXC	6-4 x 1 1/2	Co RU84C	U4	No	Cla B613	WF	H 5.67	37.1	6 1/2 x 2 1/2 x 4	T	
12	Diamond T	210 1 1/2	1595	160	186	15000	5400	B7.50/20	DB7.50/20	Her WXC	6-4 x 1 1/2	Co W4B	U4	No	Cla B642	WF	H 5.67	37.1	6 1/2 x 2 1/2 x 4	T	
13	Diamond T	210 1 1/2	2650	166	208	17500	6420	B8.25/20	DB8.25/20	Her WXC	6-4 x 1 1/2	Co RU84C	U4	No	Wls 69317 BL	2F	R 10.07	40.2	12 1/2 x 3 1/2 x 4	P	
14	Diamond T	210 1 1/2	2950	174	240	17500	6600	B8.25/20	DB8.25/20	Her WXC3	6-4 1/4 x 1 1/2	Co RU5C	U5	Op	Wls 69317 BL	2F	R 10.07	40.2	12 1/2 x 3 1/2 x 4	P	
15	Diamond T	210 1 1/2	3395	169	230	20000	7540	B9.00/20	DB9.00/20	Her YXC	6-4 1/4 x 1 1/2	Co RU5C	U5	Op	Wls 1237H	2F	R 10.07	40.2	12 1/2 x 3 1/2 x 4	P	
16	Diamond T	210 1 1/2	3695	179	246	20000	7600	B9.00/20	DB9.00/20	Her RXB	6-4 1/2 x 1 1/2	Co RU5C	U5	Op	Wls 1237H	2F	R 10.07	40.2	12 1/2 x 3 1/2 x 4	P	
17	Diamond T	210 1 1/2	3995	158	186	18000	6800	B7.00/20	DB8.25/20	Her WXC	6-4 x 1 1/2	Co RU84C	U4	No	Tim 58200H	WF	R 10.07	40.2	12 1/2 x 3 1/2 x 4	P	
18	Diamond T	210 1 1/2	4925	178	238	24000	9300	B9.75/22	DB9.75/22	Her RXC	6-4 1/2 x 1 1/2	Co SA5	A5	Op	Wls 1627 KW	2F	R 10.07	40.2	12 1/2 x 3 1/2 x 4	P	
19	Differential	DS 2 1/2	3200	160	18100	5100	P34x7	DP34x7	Lyc ASD	6-3 1/2 x 4	BL 314	U4	No	Tim 56000H	BF	H 6.1	40.2	12 1/2 x 3 1/2 x 4	P		
20	Dodge Bros. UF-10	1 1/2	375	109	109	4025	1925	B5.00/19	B5.00/19	Own	4-3 1/2 x 4	Own	U3	No	Own	SF	H 4.66	13.9	5 1/2 x 1 1/2 x 4	C	
21	Dodge Bros. UF-10	1 1/2	445	109	109	4125	1975	B5.25/19	B5.25/19	Own	4-3 1/2 x 4	Own	U3	No	Own	SF	H 4.66	13.9	5 1/2 x 1 1/2 x 4	C	
22	Dodge Bros. UF-10	1 1/2	490	124	124	4760	2260	B6.00/20	B6.00/20	Own	4-3 1/2 x 4	Own	U3	No	Own	SF	H 5.63	21.1	6 1/2 x 2 1/2 x 4	C	
23	Dodge Bros. UF-10	1 1/2	595	124	124	4860	2360	B6.00/20	B6.00/20	Own	4-3 1/2 x 4	Own	U3	No	Own	SF	H 5.63	21.1	6 1/2 x 2 1/2 x 4	C	
24	Dodge Bros. UF-10	1 1/2	495	133	133	5940	2590	P6.00/20	P32x6	Own	4-3 1/2 x 4	Own	U4	No	Own	SF	H 5.63	21.1	6 1/2 x 2 1/2 x 4	C	
25	Dodge Bros. UF-10	1 1/2	595	133	133	5940	2690	P6.00/20	P32x6	Own	4-3 1/2 x 4	Own	U4	No	Own	SF	H 5.63	21.1	6 1/2 x 2 1/2 x 4	C	
26	Dodge Bros. UF-10	1 1/2	525	131	157	8200	2490	B6.00/20	P32x6	Own	4-3 1/2 x 4	Own	U4	No	Own	SF	H 5.63	21.1	6 1/2 x 2 1/2 x 4	C	
27	Dodge Bros. UF-10	1 1/2	585	131	157	8275	2560	B6.00/20	P32x6	Own	4-3 1/2 x 4	Own	U4	No	Own	SF	H 5.63	21.1	6 1/2 x 2 1/2 x 4	C	
28	Dodge Bros. UF-10	1 1/2	795	136	165	10500	3345	B7.00/20	DB7.00/20	Own	4-3 1/2 x 4	Own	U5	No	Own	SF	H 6.37	50.9	8 1/2 x 2 1/2 x 4	C	
29	Dodge Bros. UF-10	1 1/2	595	136	165	8225	2581	B6.00/20	P32x6	Own	4-3 1/2 x 4	Own	U4	No	Own	SF	H 5.67	37.1	6 1/2 x 2 1/2 x 4	C	
30	Dodge Bros. UF-10	1 1/2	695	136	165	8275	2631	B6.00/20	P32x6	Own	4-3 1/2 x 4	Own	U4	No	Own	SF	H 5.67	37.1	6 1/2 x 2 1/2 x 4	C	
31	Dodge Bros. UF-10	1 1/2	1425	140	165	10175	3780	B6.00/20	DB6.00/20	Own	6-3 1/2 x 3	Own	U4	No	Own	SF	H 6.38	43.7	7 1/2 x 3 1/2 x 4	C	
32	Dodge Bros. UF-10	1 1/2	1995	150	190	14590	5173	B6.50/20	DB6.50/20	Own	6-3 1/2 x 4	Own	U4	No	Own	SF	H 6.38	43.7	7 1/2 x 3 1/2 x 4	C	
33	Dodge Bros. UF-10	1 1/2	1515	135	185	12250	4235	P32x6	DP32x6	Own	6-3 1/2 x 4	Own	U4	No	Own	SF	H 7.13	46.8	10 1/2 x 3 1/2 x 4	C	
34	Dodge Bros. UF-10	1 1/2	2575	170	195	19429	5789	P32x6	DP32x6	Own	6-3 1/2 x 4	Own	U4	No	Own	SF	H 7.12	46.8	10 1/2 x 3 1/2 x 4	C	
35	Dodge Bros. UF-10	1 1/2	5285	170	220	25000	7840	B9.75/20	DB9.75/20	Own	8-3 1/2 x 5	Own	U5	No	Own	SF	H 7.71	69.6	10 1/2 x 3 1/2 x 4	C	
36	Douglas	A6 1 1/2	1095	135	145	7500	3075	P30x5	P30x5	Bud J214	6-3 1/2 x 4	WG T9	U4	No	Cla B370	WF	H 5.6	36.3	5 1/2 x 3 1/2 x 4	T	
37	Douglas	A6 1 1/2	1690	150	190	9000	3950	P30x5	P32x6	Bud WTU	6-3 1/2 x 4	Fu MKU12	U4	No	Cla B370	WF	H 5.6	36.3	5 1/2 x 3 1/2 x 4	T	
38	Douglas	A6 1 1/2	2150	150	190	10500	4100	P30x5	P32x6	Bud H86	6-3 1/2 x 4	Fu MKU12	U4	No	Cla B370	WF	H 5.6	36.3	5 1/2 x 3 1/2 x 4	T	
39	Douglas	A6 1 1/2	3275	156	190	12500	5100	P32x6	P34x7	Bud KBU-1	6-4 x 1 1/2	Fu MGU14	U4	Op	Wls 6617	2F	R 6.9	44.8	6 1/2 x 2 1/2 x 4	T	
40	Douglas	A6 1 1/2	3425	168	190	15500	5850	P32x6	P34x7	Bud DW6	6-3 1/2 x 4	Fu MGU14	U4	Op	Wls 6617	2F	R 6.33	41.1	6 1/2 x 2 1/2 x 4	T	
41	Douglas	A6 1 1/2	3855	190	190	17500	5860	P34x7	P36x8	Bud EBU-1	6-4 1/2 x 5	Fu MGU14	U4	Op	Wls 8817	2F	R 7.85	51.0	7 1/2 x 3 1/2 x 4	T	
42	Douglas	A6 1 1/2	3955	190	190	17500	5800	P34x7	P36x8	Bud DW6	6-3 1/2 x 4	Fu MGU14	U4	Op	Wls 8817	2F	R 7.85	51.0	7 1/2 x 3 1/2 x 4	T	
43	Douglas	A6 1 1/2	4010	186	190	20000	6500	S36x5	S36x10	Bud YBU-1	6-4 1/2 x 6	Fu RU16	U4	Op	Wls 892A	2F	R 7.25	34.8	8 1/2 x 2 1/2 x 4	T	
44	Douglas	A6 1 1/2	4430	186	190	20000	6800	P36x6	DP38x7	Bud BUS	6-4 1/2 x 5	Fu RU16	U4	Op	Wls 892A	2F	R 7.25	34.8	8 1/2 x 2 1/2 x 4	T	
45	Douglas	A6 1 1/2	5500	216	190	22000	7200	P38x7	DP40x8	Bud K428	6-4 1/2 x 5	Fu HOG	U4	Op	Wls 1418	2F	R 18.7	74.9	10 1/2 x 3 1/2 x 4	T	
46	Douglas	A6 1 1/2	5500	186	190	26000	9200	S36x8	S40x12	Bud BBU	6-4 x 1 1/2	Fu HU18	U4	Op	Wls 1458	2F	R 9.12	57.1	10 1/2 x 3 1/2 x 4	T	
47	Douglas	A6 1 1/2	6300	196	190	26000	9200	B9.75/20	DB9.75/20	Bud GL6	6-4 x 1 1/2	Fu HU18	U4	Op	Wls 1567	2F	R 10.3	64.4			



Line Number	ENGINE DETAILS										FUEL SYST.	ELEC-TRICAL	FRONT AXLE	BRAKES		BODY MOUNT-ING DATA		SPRINGS													
	Piston Displacement	Compression Ratio	Torque lb. ft.	N.A.C.C. Rated H.P.	Max. Brake H.P. at R.P.M. Given	Valve Arrangement	Camshaft Drive	Piston Material	MAIN BEARINGS	Number and Diameter				Length	Oiling System Type	Governor Make	Carburetors Make	Fuel Feed	Ignition System Make	Generator, Starter Make	Clutch Type and Make	Radiator Make	Universal Make	Steering Gear Make	SERVICE		Hand Type, Location	Cab to Rear of Frame	Cab to Rear Axle	Width of Frame	Front
											Make, Location Type, Operation	Lining Area	Drum Material																		
1214	4.9	14.2	27.3	61	3000	L	C	A4	2-3/4	6 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3000H	Ros	L4IH	380a	TX	106 1/2	58 1/2	34	40x2 1/4	54x2 1/4	54x2 1/4	54x2 1/4
248	5.0	16.0	27.3	65	2700	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	Pe	Spl	Tim 3000H	Ros	L4IH	380a	TX	105	57	34	40x2 1/4	54x2 1/4	54x2 1/4	54x2 1/4
311	4.1	16.0	27.3	65	2700	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	Pe	Spl	Tim 3100H	Ros	L4IH	452a	TX	135	78 1/2	33 1/2	40x2 1/4	54x2 1/4	54x2 1/4	54x2 1/4
639	4.2	21.2	38.4	82	2400	H	C	A4	2-3/4	13 1/2	FP	No	Zen	M	DR	DR	P.B.L	Pe	Spl	Tim 3300H	Ros	L4IH	578a	TX	124 1/2	69 1/2	33 1/2	40x2 1/4	56x3	56x3	56x3
742	4.2	26.7	45.9	100	2600	H	C	A4	2-3/4	13 1/2	FP	No	Zen	M	DR	DR	P.B.L	Pe	Spl	Tim 3300H	Ros	L4IH	659a	DX	132	80 1/2	34	42x2 1/4	56x3	56x3	56x3
822	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.L	GO	Spl	Tim 3500H	Ros	L4IHV	768a	DX	132	80 1/2	34	42x2 1/4	56x3	56x3	56x3
102	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.L	GO	Spl	Tim 3602H	Ros	L4IH	921a	DX	132	80 1/2	34	42x2 1/4	56x3	56x3	56x3
113	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	188a	TX	93	51 1/2	34	42x2 1/4	56x3	56x3	56x3
122	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	219a	TX	96	54	34	42x2 1/4	56x3	56x3	56x3
133	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	350a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
143	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
154	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
165	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
176	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
187	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
198	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
209	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
220	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
231	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
242	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
253	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
264	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
275	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
286	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
297	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
308	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
319	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
330	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
341	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
352	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
363	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
374	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
385	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
396	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
407	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
418	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
429	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros	L4IH	408a	TX	126	72	34	42x2 1/4	56x3	56x3	56x3
440	4.4	14.3	27.3	60	2400	L	C	A4	2-3/4	10 1/2	FP	No	Zen	M	DR	DR	P.B.B.	GO	Spl	Tim 3602H	Ros										



Line Number	MAKE AND MODEL	GENERAL (See Keynote)					TIRE SIZE		MAJOR UNITS				FRAME						
		Tonnage Rating	Chassis Price	Standard Wheelbase	Max. W. B. Furnished	Gross Vehicle Weight	Chassis Wt. (Stripped)	Front	Rear	ENGINE		TRANSMISSION		REAR AXLE					
										Make and Model	No. of Cylinders Bore and Stroke	Make and Model	Location and Forward Speeds	Make and Model	Gear and Type	Drive and Torque	GEAR RATIOS		

Line Number	ENGINE DETAILS										MAIN BEARINGS	Oiling System Type	Governor Make	Carburetors Make	Fuel Feed	Ignition System Make	Generator, Starter Make	Clutch Type and Make	Radiator Make	Universal Make	FRONT AXLE	Steering Gear Make	BRAKES		BODY MOUNT-ING DATA		SPRINGS		Auxiliary Type		
	Piston Displacement	Compression Ratio	Torque lb. ft.	N.A.C.C. Rated H.P.	Max. Brake H.P. at R.P.M. Given	Valve Arrangement	Camshaft Drive	MAIN BEARINGS		Service													Lining Area	Drum Material	Hand Type, Location	Cab to Rear of Frame	Cab to Rear Axle	Width of Frame		Front	Rear
								Number and Diameter	Length																						
1331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	69 1/2	34 1/2	40x3	54x3			
2331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
3331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
4331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
5331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
6331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
7331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
8331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
9331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
10331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
11331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
12331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
13331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
14331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
15331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
16331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
17331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
18331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
19331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
20331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
21331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
22331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
23331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
24331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
25331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
26331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
27331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
28331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
29331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
30331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
31331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
32331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
33331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
34331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
35331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
36331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
37331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
38331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
39331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
40331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
41331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
42331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
43331	4.4	230	33.7	94-2500	H	H	4-3/4	8 1/2	PC	Ha	Str	M	DR	DR	D.Ow	Lo	Spl	Own	Jac	B4IMV	449	a	TX	125	70	34 1/2	40x3	54x3			
44331	4.4	230	33.																												



Line Number	MAKE AND MODEL	GENERAL (See Keynote)				TIRE SIZE				MAJOR UNITS										FRAME			
		Tonnage Rating	Chassis Price	Standard Wheelbase	Max. W. B. Furnished	Gross Vehicle Weight	Chassis Wt. (Stripped)	Front	Rear	ENGINE		TRANSMISSION		REAR AXLE				Gear and Type	Drive and Torque	GEAR RATIOS		Side Rail Dimensions	Type
										Make and Model	No. of Cylinders Bore and Stroke	Make and Model	Location and Forward Speeds	Aux. Location and Speeds	Make and Model	In High	In Low						
1	Larrabee (concluded)	75-4	5200	167	205	20800	7850	B9.75/20	DB9.75/20	Con 20R	6-4 1/2 x 4 1/2	BL 55	A 7	No	Tim 65720DH	WF	H 8.50	80.8	8x3 1/2 x 1 1/2	P	C		
2	Le Moon	150 1 1/2-2	1150	140	152	8000	3300	B6.50/20	B6.50/20	Con 21R	6-4 1/2 x 4 1/2	BL 55	A 7	No	Tim 66702DH	WF	H 9.0	85.8	8x3 1/2 x 1 1/2	C	P		
3		150 1 1/2-2	1350	160	172	11200	3600	B7.00/20	DB7.00/20	Con 16C	6-3 3/4 x 4 1/2	BL 214	U 4	No	Tim 53200H	BF	H 5.14	31.8	6x3 x 3/4	C	C		
4		300 2-3	1575	163	190	12600	4200	B7.50/20	DB7.50/20	Con 16C	6-3 3/4 x 4 1/2	BL 214	U 4	No	Tim 54200H	BF	H 6.80	42.1	6 1/2 x 3 1/2 x 1/2	C	C		
5		400 3-4	2175	163	190	15300	5000	B8.25/20	DB8.25/20	Wau 6MS	6-3 3/4 x 4 1/2	BL 314	U 4	No	Tim 56200H	BF	H 6.16	40.6	6 1/2 x 3 1/2 x 1/2	C	C		
6		500 4-5	2775	160	190	19500	6000	B9.00/20	DB9.00/20	Wau 6MK	6-4 1/2 x 4 1/2	BL 514	U 4	No	Tim 58200H	BF	R 6.14	40.6	7x4 x 1/2	C	C		
7		501 4-5	3150	160	190	19500	6500	B9.00/20	DB9.00/20	Wau 6SRL	6-4 1/2 x 4 1/2	Fu VUOG	U 5	No	Tim 58200H	BF	R 6.14	40.6	7x4 x 1/2	C	C		
8		600 5-6	3450	169	199	21600	7200	B9.75/20	DB9.75/20	Wau 6SRL	6-4 1/2 x 4 1/2	Fu VUOG	U 5	No	Tim 58200H	WF	R 6.00	43.2	7x4 x 1/2	C	P		
9	Maccar	36A 1 1/2-2 1/2	2050	155	183	12000	4850	P7.00/20	DP7.00/20	Bud H29H	6-3 3/4 x 4 1/2	BL 314	U 4	No	Tim 54200H	BF	R 6.00	43.2	7x4 x 1/2	C	C		
10		40A 2 1/2-3	2400	155	183	15000	5350	P7.50/20	DP7.50/20	Bud H29H	6-3 3/4 x 4 1/2	BL 314	U 4	No	Tim 56200H	BF	R 6.16	38.7	7x3 x 3/4	C	C		
11		56 3-5	3350	153	194	18000	6200	P8.25/20	DP8.25/20	Bud DW6	6-3 x 5	BL 514	U 4	No	Wis 6787L	2F	R 7.00	37.4	8x3 x 3/4	T	T		
12		60 3-5	3950	153	207	18000	6600	P9.00/20	DP9.00/20	Bud BA6	6-4 1/2 x 5 1/2	BL 514	U 4	No	Tim 75200H	2F	R 6.4	34.4	8x3 x 3/4	T	T		
13		60A 4-6	4500	153	207	22000	7300	B9.00/20	DB9.00/20	Bud BA6	6-4 1/2 x 5 1/2	BL 554	U 4	No	Tim 65720H	WF	R 6.8	43	8x3 x 3/4	T	T		
14		66A 4-6	5500	184	235	22000	8200	P9.75/20	DP9.75/20	Her YXCP3	6-4 1/2 x 4 1/2	BL 615	A 5	No	Tim 65720H	WF	R 6.8	44.5	12x3 x 1/2	T	T		
15		86A 5-8	5950	184	235	30000	9500	P10.50/20	DP10.50/20	Her YXCP3	6-4 1/2 x 4 1/2	BL 70	A 5	No	Tim 66720W	WF	R 7.6	49.8	12x3 x 1/2	T	T		
16	Mack	BL 1-2	2500	138	148	8250	4050	B6.00/20	DB6.00/20	Own BL	6-3 1/2 x 5	Own BG	U 4	No	Tim 52000B2	SF	H 5.66	27.9	7x3 x 3/4	T	T		
17		300 1 1/2-3	3000	138	192	10850	4800	P32x6	DP32x6	Own BG	6-3 1/2 x 5	Own BG	U 4	No	Own BG	SF	H 5.44	26.8	7x3 x 3/4	T	T		
18		BF 2 1/2-4	4200	156	198	14500	6600	B8.25/20	DB8.25/20	Own BG	6-3 1/2 x 5	Own BG	U 4	No	Own AB	2F	H 7.01	33.9	7x3 x 3/4	T	T		
19		AB 3-5	4000	147	219	15450	6450	P34x7	DP34x7	Own AB	6-4 1/2 x 5	Own AB	U 4	No	Own AB	2F	H 6.17	40.6	8x2 1/2 x 1/2	T	T		
20		AB 3-5	4200	147	219	15450	6450	P34x7	DP34x7	Own BG	6-3 1/2 x 5	Own AB	U 4	No	Own AB	2F	H 7.58	36.7	8x2 1/2 x 1/2	T	T		
21		AB 3-5	4150	147	219	15450	6450	P34x7	DP34x7	Own BG	6-3 1/2 x 5	Own AB	U 4	No	Own AB	2F	H 7.58	36.7	8x2 1/2 x 1/2	T	T		
22		AB 3-5	4500	147	219	15450	6700	P34x7	DP34x7	Own BG	6-3 1/2 x 5	Own AB	U 4	No	Own AB	2F	H 7.58	36.7	8x2 1/2 x 1/2	T	T		
23		BM 3-5	4700	157	217	17500	7500	B9.00/20	DB9.00/20	Own BC	6-4 1/2 x 5	Own BC	U 4	No	Own AB	2F	H 7.01	40.9	7x3 x 3/4	T	T		
24		BC 4-6	5250	154	226	19750	7850	P36x8	DP36x8	Own BC	6-4 1/2 x 5	Own BC	U 4	No	Own BC	2F	H 7.58	44.2	8x3 x 3/4	T	T		
25		BC 4-6	5500	154	226	26575	8000	P36x8	DP36x8	Own BK	6-4 1/2 x 5	Own BC	U 4	No	Own BC	2F	H 7.58	44.2	8x3 x 3/4	T	T		
26		BJ 5-8	6450	168	245	26575	9800	B10.50/22	DB10.50/22	Own BK	6-4 1/2 x 5	Own AL	A 4	No	Own AK	2F	H 8.92	55.3	8x3 1/2 x 1/2	T	T		
27		AK 5-8	5150	162	228	28500	9500	B10.50/24	DB10.50/24	Own AK	6-4 1/2 x 5	Own AK	A 4	No	Own AK	2F	H 8.92	55.3	8x3 1/2 x 1/2	T	T		
28		AK 5-8	5250	162	228	28500	9400	B10.50/24	DB10.50/24	Own AK	6-4 1/2 x 5	Own AK	A 4	No	Own AK	2F	H 8.92	55.3	8x3 1/2 x 1/2	T	T		
29		AK 5-8	6450	174	240	26100	10400	B10.50/22	DB10.50/22	Own BK	6-4 1/2 x 5	Own AK	A 4	No	Own AK	2F	H 6.92	44.2	8x3 x 3/4	C	C		
30		AK 5-8	4950	168	240	28000	9200	B10.50/24	DB10.50/24	Own AK	6-4 1/2 x 5	Own AK	A 4	No	Own AK	2F	H 8.46	54.4	8x3 x 3/4	C	C		
31		AK 5-8	6450	174	240	28500	11400	B10.50/24	DB10.50/24	Own BK	6-4 1/2 x 5	Own AK	A 4	No	Own AK	2F	H 8.46	54.4	8x3 x 3/4	C	C		
32		AP 7 1/2-10	8500	191	191	14450	11700	S36x7	DS40x8	Own AP	6-4 1/2 x 5	Own AP	J 4	No	Own AP	2F	H 8.31	53.3	8x3 x 3/4	C	C		
33	Marmon-Herr	T-30 3-4	5785	158	188	18450	8450	B9.00/20	DB9.00/20	Her WXC3	6-4 1/2 x 4 1/2	Fu JVUOG	U 5	A 2	Wis 698Q	2F	H Opt	Opt	6x2 1/2 x 1/2	P	P		
34		T-31 4-5	6785	163	193	22620	9620	B9.75/20	DB9.75/20	Her YXC3	6-4 1/2 x 4 1/2	Fu VUOG	U 5	A 2	Wis 1237W	2F	H Opt	Opt	8x3 x 3/4	P	P		
35		T-31 4-5	7785	163	193	23120	10120	B9.75/22	DB9.75/22	Her RXC	6-4 1/2 x 4 1/2	Fu VUOG	U 5	A 2	Wis 1627KW	2F	H Opt	Opt	8x3 x 3/4	P	P		
36		T-32 5 1/2 up	9500	188	228	30190	14690	B10.50/22	DB10.50/22	Her HXB	6-5 x 6	BL 724	U 4	A 3	Wis 1737KW	2F	H Opt	Opt	10 1/2 x 3 x 3/4	P	P		
37		T-33 5 1/2 up	1230	188	228	33920	14920	B11.25/24	DB11.25/24	Her HXD	6-5 x 6	BL 724	U 4	A 3	Wis Spec	2F	H Opt	Opt	10 1/2 x 3 x 3/4	P	P		
38	Moreland	RR-2 1 1/2	1750	159	...	8000	4195	B5.50/20	DB5.50/20	Con 16C	6-3 3/4 x 4 1/2	BL 224	U 4	No	Tim 53200H	SF	H 5.66	27.9	7x3 x 3/4	T	T		
39		RR-10 2	1950	159	...	10000	4585	B6.50/20	DB6.50/20	Con 16C	6-3 3/4 x 4 1/2	BL 224	U 4	No	Tim 54200H	SF	H 5.83	36.1	7x3 x 3/4	T	T		
40		B13 1 1/2-3 1/2	2815	184	...	15000	5815	B8.25/20	DB8.25/20	Her WXC	6-4 1/2 x 4 1/2	BL 314	U 4	No	Tim 56200H	SF	R 6.17	40.6	8x3 x 3/4	T	T		
41		B16 1 1/2-3 1/2	3025	184	...	18000	6195	B9.00/20	DB9.00/20	Her WXC	6-4 1/2 x 4 1/2	BL 314	U 4	No	Tim 58200H	SF	R 6.13	40.6	8x3 x 3/4	T	T		
42		E16 1 1/2-3 1/2	3300	184	...	18000	6460	B9.00/20	DB9.00/20	Her WXC3	6-4 1/2 x 4 1/2	BL 51-4	U 4	No	Tim 58200H	SF	R 6.13	40.6	8x3 x 3/4	T	T		
43		E19 2 1/2-5 1/2	3800	184	...	21000	7155	B9.75/20	DB9.75/20	Her WXC3	6-4 1/2 x 4 1/2	BL 51-4	U 4	No	Tim 65720H	FW	R 7.25	38	9x3 x 3/4	T	T		
44		H-24 5 1/2-6 1/2	5335	196	...	24000	8700	B9.75/20	DB9.75/20	Her RZX	6-4 1/2 x 4 1/2	BL 554	U 4	No	Tim 66720W	FW	R 8.20	59.7	9x3 x 3/4	T	T		
45	Netco	A 1 1/2-2	2800	146	168	8400	4000	B6.00/20	DB6.00/20	Wau 6ZK	6-3 3/4 x 4 1/2	BL 214	U 4	No	Tim 52000H	BF	H 4.85	Opt	6x2 1/2 x 1/2	C	C		
46		B 2 1/2-3 1/2	3000	155	183	12600	5000	B7.50/20	DB7.50/20	Wau 6TL	6-3 3/4 x 4 1/2	BL 314	U 4	No	Tim 54000H	BF	H 5.83	Opt	6x3 x 3/4	C	C		
47		C 3 1/2-4 1/2	3500	160	200	15300	6000	B8.25/20	DB8.25/20	Wau 6MK	6-4 1/2 x 4 1/2												

Line Number	ENGINE DETAILS										FUEL SYST.	ELEC-TRICAL	FRONT AXLE	BRAKES		BODY MOUNT-ING DATA		SPRINGS												
	Piston Displacement	Compression Ratio	Torque lb. ft.	N.A.C.C. Rated H.P.	Max. Brake H.P. at R.P.M. Given	Valve Arrangement	Camshaft Drive	MAIN BEARINGS		Governor Make				Carburetors Make	Fuel Feed	Ignition System Make	Generator, Starter Make	Clutch Type and Make	Radiator Make	Universal Make	Steering Gear Make	SERVICE		Hand Type, Location	Cab to Rear of Frame	Cab to Rear Axle	Width of Frame	Front	Rear	Auxiliary Type
								Piston Material	Number and Diameter													Length	Lining Area							
1380	4.4	2.231	40.8	89-2400	H	C	7-3	13	FP	No	Zen	G	DR	DR	D.B.L	Pe	Spl	Tim	35000H	Ros	L4IH	768	G	TD	Opt	Opt	34	40x2 1/2	56x3	
2424	4.4	2.238	45.9	97-2400	H	C	7-3	13	FP	No	Zen	G	DR	DR	D.B.L	Pe	Spl	Tim	16702H	Ros	L4IH	768	G	TD	Opt	Opt	34	40x2 1/2	56x3	
3484	4.4	1.507	37.7	65-2800	H	C	7-3	10	FP	No	Zen	M	DR	DR	D.B.L	Ch	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
4484	4.4	1.507	37.7	65-2800	H	C	7-3	10	FP	No	Zen	M	DR	DR	D.B.L	Ch	Spl	Tim	30000H	Ros	L4IH	275	C	TX	128	81	34	37 1/2 x 2 1/2	50x2 1/2	
5484	4.4	1.507	37.7	65-2800	H	C	7-3	10	FP	No	Zen	M	DR	DR	D.B.L	Ch	Spl	Tim	31000H	Ros	L4IH	293	C	TX	128	81	34	37 1/2 x 2 1/2	50x2 1/2	
6315	4.6	2.00	33.7	72-2500	H	C	7-3	12	FP	No	Zen	M	DR	DR	D.B.L	Ch	Spl	Tim	33000H	Ros	L4IH	345	C	TX	128	81	34	37 1/2 x 2 1/2	50 1/2 x 2 1/2	
7381	4.4	2.242	40.8	85-2500	H	C	7-3	12	FP	No	Zen	M	DR	DR	D.B.L	Ch	Spl	Tim	35000H	Ros	L4IHV	385	C	TX	128	81	34	39x2 1/2	53x3	
8462	4.5	3.00	45.9	98-2000	H	C	7-3	13	FP	No	Zen	W	DR	DR	D.Fu	Ch	Spl	Tim	35000H	Ros	L4IHV	485	C	RI	128	81	34	39x2 1/2	53x3	
9462	4.5	3.00	45.9	98-2000	H	C	7-3	13	FP	No	Zen	W	DR	DR	D.Fu	Ch	Spl	Tim	35000H	Ros	L4IHV	485	C	RI	128	81	34	39x2 1/2	53x3	
10298	4.7	1.88	33.7	83-2800	H	C	7-3	13	FP	No	Zen	M	DR	DR	P.B.L	Pe	Spl	Tim	31000H	Ros	L4IH	293	A	TD	114	72	32	42x2 1/2	54x2 1/2	
11298	4.7	1.88	33.7	83-2800	H	C	7-3	13	FP	No	Zen	M	DR	DR	P.B.L	Pe	Spl	Tim	14703H	Ros	L4IHV	343	A	TD	114	72	32	42x2 1/2	54x2 1/2	
12381	4.7	2.272	40.8	103-2100	H	C	7-3	14	FP	No	Zen	M	DR	DR	P.B.L	Pe	Spl	Tim	35020H	Ros	L4IHV	412	A	FD	107	70	32	42x2 1/2	54x3	
13411	4.5	2.272	40.8	103-2100	H	C	7-3	14	FP	No	Zen	M	DR	DR	P.B.L	Pe	Spl	Tim	35020H	Ros	L4IHV	412	A	FD	104	68	32	42x2 1/2	54x3	
14411	4.5	2.272	40.8	103-2100	H	C	7-3	14	FP	No	Zen	M	DR	DR	P.B.L	Pe	Spl	Tim	35020H	Ros	L4IHV	412	A	FD	104	68	32	42x2 1/2	54x3	
15479	4.5	3.18	51.2	102-2000	H	C	7-3	14	FP	No	Zen	M	DR	DR	P.B.L	Pe	Spl	Tim	26450TW	Ros	W4A1A	618	A	TD	144	95	33	42x3	58x3	
16479	4.5	3.18	51.2	102-2000	H	C	7-3	14	FP	No	Zen	M	DR	DR	P.B.L	Pe	Spl	Tim	26450TW	Ros	W4A1A	618	A	TD	144	95	33	42x3	58x3	
17248	5.1	1.25	45.4	61-2600	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
18248	5.1	1.25	45.4	61-2600	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
19248	5.1	1.25	45.4	61-2600	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
20248	5.1	1.25	45.4	61-2600	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
21248	5.1	1.25	45.4	61-2600	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
22309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
23309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
24309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
25309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
26309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
27309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
28309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
29309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
30309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
31309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
32309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
33309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
34309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
35309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
36309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
37309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
38309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
39309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
40309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
41309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
42309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
43309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
44309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
45309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
46309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
47309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
48309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
49309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
50309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen	V	DR	DR	D.Ow	Ow	Spl	Tim	30000H	Ros	L4IH	275	C	TX	96	58	34	37 1/2 x 2 1/2	49 1/2 x 3 1/2	
51309	4.7	1.83	31.5	75-2500	H	C	7-3	11	FP	No	Zen																			



Line Number	MAKE AND MODEL	Wheels Driven—6-Wheelers	GENERAL (See Keynote)				TIRE SIZE		MAJOR UNITS										FRAME				
			Tonnage Rating	Chassis Price	Standard Wheelbase	Max. W. B. Furnished	Gross Vehicle Weight	Chassis Wt. (Stripped)	Front	Rear	ENGINE		TRANSMISSION		REAR AXLE		GEAR RATIOS	Side Rail Dimensions	Type				
											Make and Model	No. of Cylinders Bore and Stroke	Make and Model	Location and Forward Speeds	Make and Model	Location and Forward Speeds				Make and Model	Drive and Torque	In High	In Low
1	Sterling (cone'd)	FC100	5-5 1/2	4950	192	222		7750	P36x8	DP36x8	Wau 6MK	6-4 1/2 x 4 1/2	Own UC2	U4	Op	Own	CD	R 9.3	61.2	12x3 1/2 x 4 1/2	C		
2	FW115	FD115	5-5 1/2	5150	192	222		8000	B9.00/20	DB9.00/20	Wau 6SR	6-4 1/2 x 4 1/2	Own UC2	U4	Op	Own	CD	R 8.66	61.7	12x3 1/2 x 4 1/2	C		
3	FC107		5-6 1/2	4805	192	222		8750	P40x8	DP40x8	Wau 6SR	6-4 1/2 x 4 1/2	Own UC2	U4	Op	Own	CD	R 8.20	54.6	12x3 1/2 x 4 1/2	C		
4	FC120		6-7	5200	192	222		8200	P36x8	DP36x8	Wau 6SR	6-4 1/2 x 4 1/2	Own UC2	U4	Op	Own	CD	R 9.3	62.2	12x3 1/2 x 4 1/2	C		
5	FC120S		7 1/2	5350	192	222		8550	P40x8	DP40x8	Wau 6MK	6-4 1/2 x 4 1/2	Own UC2	U4	Op	Own	CD	R 8.66	61.7	12x3 1/2 x 4 1/2	C		
6	FW140	FD140	7-8	5650	192	222		8400	B9.75/20	DB9.75/20	Wau 6SR	6-4 1/2 x 4 1/2	Own UC2	U4	J 3	Own	CD	R 10.0	66.6	15x3 1/2 x 4 1/2	C		
7	FC135		7-8	6070	192	222		10050	P40x8	DP42x9	Wau SRL	6-4 1/2 x 4 1/2	Own UC2	U4	Op	Tim	W/F	R 10.0	66.6	15x3 1/2 x 4 1/2	C		
8	FC140		7-8	5825	192	222		8900	P40x8	DP40x8	Wau SRL	6-4 1/2 x 4 1/2	Own UC2	U4	Op	Own	CD	R 9.3	62.2	15x3 1/2 x 4 1/2	C		
9	FC145		8-8 1/2	6500	200	230		9500	P40x8	DP40x8	Wau RB	6-4 1/2 x 4 1/2	Own UC2	U4	Op	Own	CD	R 8.3	55.2	15x3 1/2 x 4 1/2	C		
10	FW170	FD170	9-10 1/2	6925	200	230		10100	P40x8	DP40x8	Wau AB	6-4 1/2 x 4 1/2	Own UC8	U4	Op	Own	CD	R 9.4	58.9	15x3 1/2 x 4 1/2	C		
11	FC170		9-10 1/2	6070	200	230		10550	P40x8	DP44x10	Wau AB	6-4 1/2 x 4 1/2	Own UC8	U4	Op	Tim	W/F	R 10.0	62.7	15x3 1/2 x 4 1/2	C		
12	Stewart		30	7595	200	230		10550	P40x8	DP42x9	Wau RB	6-5 1/2 x 4 1/2	Own UC8	U4	Op	Own	CD	R 9.4	58.9	15x3 1/2 x 4 1/2	C		
13	30X1		1 1/2	695	130	160		2977	B6.50/20	B6.50/20	Lyc AFE	4-3 1/2 x 4 1/2	War	U4	No	Cl	SF	H 5.6	35.8	6x2 1/2 x 4 1/2	T		
14	42X1		1 1/2	795	130	160		3018	B6.50/20	B6.50/20	Lyc WTG	6-3 1/2 x 4 1/2	WG T9	U4	No	Cl	SF	H 6.38	40.8	6x2 1/2 x 4 1/2	T		
15	40X1		1 1/2	795	134	176		3525	B6.50/20	B6.50/20	Lyc SA	6-3 1/2 x 4 1/2	WG	U4	No	Cl	SF	H 5.6	35.8	7 1/2 x 2 1/2 x 4 1/2	T		
16	50X2		2	1195	145	176		3460	B6.50/20	B6.50/20	Lyc SA	6-3 1/2 x 4 1/2	WG	U4	No	Cl	SF	H 5.6	35.8	7 1/2 x 2 1/2 x 4 1/2	T		
17	29X8		2 1/2	995	145	176		4005	B6.50/20	B6.50/20	Lyc SB	6-3 1/2 x 4 1/2	WG	U4	No	Cl	SF	H 6.3	22	7 1/2 x 2 1/2 x 4 1/2	T		
18	32X2		2 1/2	1195	145	176		4015	B6.50/20	DB6.50/20	Lyc SB	6-3 1/2 x 4 1/2	War	U4	No	Cl	SF	H 6.37	22.0	7 1/2 x 2 1/2 x 4 1/2	T		
19	58-8		2 1/2	1695	145	190		4960	B.700/20	DB7.00/20	Lyc ASD	6-3 1/2 x 4 1/2	Ful	U4	No	Cl	SF	R 6.37	44.4	7 1/2 x 2 1/2 x 4 1/2	T		
20	18X3		3	1990	165	220		5260	B7.00/20	DB7.00/20	Lyc ASD	6-3 1/2 x 4 1/2	Fu	U4	No	Cl	SF	R 6.37	44.4	7 1/2 x 2 1/2 x 4 1/2	T		
21	42-8		3 1/2	2390	170	226		5970	B7.50/20	DB7.50/20	Lyc HFA	8-3 1/2 x 4 1/2	Fu	U4	No	Cl	SF	H 7.25	47.0	9x2 1/2 x 4 1/2	T		
22	42-8		3 1/2	2690	165	220		6400	B7.50/20	DB7.50/20	Lyc TS	6-3 1/2 x 4 1/2	Fu	U4	No	Tim	WF	R 7.25	47.5	9x2 1/2 x 4 1/2	T		
23	42-8		3 1/2	6750	170	241		6750	B8.25/20	DB8.25/20	Lyc AEC	8-3 1/2 x 4 1/2	Fu	U4	A 3	Tim	WF	R 7.25	127	9x2 1/2 x 4 1/2	T		
24	38-6		3 1/2	3690	165	235		7110	B9.00/20	DB9.00/20	Lyc TS	6-3 1/2 x 4 1/2	Fu	U4	A 3	Tim	WF	R 7.25	127	9x2 1/2 x 4 1/2	T		
25	38-8		3 1/2	3990	170	241		7600	B9.00/20	DB9.00/20	Wau 6SR	6-4 1/2 x 4 1/2	BL	U4	A 3	Tim	DF	R 7.3	147	9x2 1/2 x 4 1/2	T		
26	31X5		5	3990	170	241		7600	B9.00/20	DB9.00/20	Lyc AE	8-3 1/2 x 4 1/2	BL	U4	A 3	Tim	DF	R 7.3	147	9x2 1/2 x 4 1/2	T		
27	27X8		7	5190	165	235		9340	B9.75/20	DB9.75/20	Wau 6SR	6-4 1/2 x 4 1/2	BL	U4	A 3	Tim	WF	R 8.2	151	9x2 1/2 x 4 1/2	T		
28	Studebaker	S1	1 1/2	6190	165	235		10300	B10.50/24	DB10.50/24	Wau 6SR	6-4 1/2 x 4 1/2	BL	U4	A 3	Tim	WF	R 8.2	151	9x2 1/2 x 4 1/2	T		
29	S21		1 1/2	595	114	144		4285	B5.25/19	B5.25/19	Own GL	6-3 1/2 x 4 1/2	WG T2C	U3	No	Own 54	SF	H 4.73	15.2	5 1/2 x 2 1/2 x 4 1/2	T		
30	S41		2	670	136	165		8000	B6.50/20	B6.50/20	Own T1	6-3 1/2 x 4 1/2	War T9	U4	No	Cl	SF	H 5.6	35.8	6x2 1/2 x 4 1/2	T		
31	S120		3	895	141	165		10000	B6.50/20	DB6.50/20	Own T2	6-3 1/2 x 4 1/2	War T9	U4	No	Cl	SF	H 6.8	43.5	7 1/2 x 2 1/2 x 4 1/2	T		
32	Walter	FN	2 1/2-3	1350	141	183		16000	B6.50/20	DP32x6	Own T2	6-3 1/2 x 4 1/2	War T9	U4	A 2	Tim	58200	SF	H 6.8	66.1	8x2 1/2 x 4 1/2	T	
33	FM		3-4	4500	120		15000	B9.00/20	B9.00/20	Own 6MK	6-4 1/2 x 4 1/2	Own FN	U5	No	Own FN	2D	H 7.0	70.0	7x2 1/2 x 4 1/2	T			
34	FKD		4-6	5500	120	144		18000	B9.00/20	DB9.00/20	Own 6SR	6-4 1/2 x 4 1/2	Own FM	U5	No	Own FM	2D	H 6.00	60.0	10x2 1/2 x 4 1/2	T		
35	FCS		5-7	6300	118	136		24000	B9.00/24	DB9.00/24	Own 6SR	6-4 1/2 x 4 1/2	Own FK	U5	No	Own FK	2D	H 8.50	85.0	11x3 1/2 x 4 1/2	T		
36	FBS		5-7	6900	136	160		26000	B9.75/24	DB9.75/24	Own 6SR	6-4 1/2 x 4 1/2	Own FK	U5	No	Own FK	2D	H 8.5	85.0	13x3 1/2 x 4 1/2	T		
37	FBS		7-9	7900	136	160		26000	B9.75/24	DB9.75/24	Own 6SR	6-4 1/2 x 4 1/2	Own FK	U5	No	Own FK	2D	H 8.5	85.0	13x3 1/2 x 4 1/2	T		
38	Ward LaFr	25R14	3	8300	136	160		31000	B10.50/24	DB10.50/24	Own 6SR	6-4 1/2 x 4 1/2	Own FK	U5	No	Own FK	2D	H 8.5	85.0	13x3 1/2 x 4 1/2	T		
39	25B14		3	2975	Op	Op		14000	B8.25/20	DB8.25/20	Wau 6ML	6-4 1/2 x 4 1/2	BL 324	U4	No	Tim	56200H	SF	R 6.0	Op	Op	12x3 1/2 x 4 1/2	T
40	30B18		4	2975	Op	Op		14000	B8.25/20	DB8.25/20	Own 12K	8-3 1/2 x 4 1/2	BL 324	U4	No	Tim	56200H	SF	R 6.0	Op	Op	12x3 1/2 x 4 1/2	T
41	30R18		4	3585	197	209		18000	B9.00/20	DB9.00/20	Own 12K	8-3 1/2 x 4 1/2	BL 524	A 4	Op	Tim	56200H	2F	R 6.0	Op	Op	12x3 1/2 x 4 1/2	T
42	35R5		4	3585	197	209		18000	B9.00/20	DB9.00/20	Wau 6MK	6-4 1/2 x 4 1/2	BL 524	A 4	Op	Tim	56200H	2F	R 6.0	Op	Op	12x3 1/2 x 4 1/2	T
43	75RW		7 1/2	4675	Op	Op		23000	B8.25/20	DB8.25/20	Wau SRL	6-4 1/2 x 4 1/2	BL 534	A 4	Op	Tim	56200H	WF	R 6.0	Op	Op	14x3 1/2 x 4 1/2	T
44	100RW		10	4675	Op	Op		23000	B8.25/20	DB8.25/20	Lyc AEC	8-3 1/2 x 4 1/2	BL 534	A 4	Op	Tim	56200H	WF	R 6.0	Op	Op	14x3 1/2 x 4 1/2	T
45	60K		1 1/2-1 1/2	6900	Op	Op		28000	B10.50/20	DB10.50/20	Wau RB	6-5 1/2 x 4 1/2	BL 714	U4	A 3	Tim	68720W	WF	R 6.0	Op	Op	14x3 1/2 x 4 1/2	T
46	601		1 1/2-1 1/2	7350	Op	Op		32000	B10.50/24	DB10.50/24	Wau RB	6-5 1/2 x 4 1/2	BL 714	U4	A 3	Tim	68720W	WF	R 6.0	Op	Op	14x3 1/2 x 4 1/2	T
47	161		1 1/2-1 1/2	1850	112			3905	B7.00/20	DB7.00/20	Own 2A	6-3 1/2 x 4 1/2	Own 3BC	U3	No	Own 4C	SF	H 5.8	17.6	15x			

Line Number	ENGINE DETAILS										MAIN BEARINGS	Oiling System Type	Governor Make	FUEL SYST.		ELEC-TRICAL		FRONT AXLE	BRAKES	BODY MOUNT-ING DATA		SPRINGS		Auxiliary Type									
	Piston Displacement	Compression Ratio	Torque lb. ft.	N.A.C.C. Rated H.P.	Max. Brake H.P. at R.P.M. Given	Valve Arrangement	Camshaft Drive	Piston Material	Number and Diameter	Length				Carburetors Make	Fuel Feed	Ignition System Make	Generator, Starter Make			Clutch Type and Make	Radiator Make	Universal Make	Make and Model		Steering Gear Make	SERVICE		Hand Type, Location	Cab to Rear of Frame	Cab to Rear Axle	Width of Frame	Front	Rear
																										Make, Location Type Operation	Lining Area						
1381	4.4	240	40.8	85-2500	91-2400	L	L	CC	7-2	12	CC	Ha	Zen	M	DR	DR	D.Own	Mo	Spl	Tim	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
2411	4.4	240	40.8	85-2500	91-2400	L	L	CC	7-2	12	CC	Ha	Zen	M	DR	DR	D.Own	Mo	Spl	Tim	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
462	4.5	300	45.9	102-2400	102-2400	L	L	CC	7-3	13	CC	Ha	Zen	M	DR	DR	D.Own	Mo	Spl	Tim	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
531	4.4	240	40.8	85-2500	91-2400	L	L	CC	7-2	12	CC	Ha	Zen	M	DR	DR	D.Own	Mo	Spl	Tim	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
642	4.5	300	45.9	102-2400	102-2400	L	L	CC	7-3	13	CC	Ha	Zen	M	DR	DR	D.Own	Mo	Spl	Tim	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
746	4.5	300	45.9	102-2400	102-2400	L	L	CC	7-3	13	CC	Ha	Zen	M	DR	DR	D.Own	Mo	Spl	Tim	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
846	4.5	300	45.9	102-2400	102-2400	L	L	CC	7-3	13	CC	Ha	Zen	M	DR	DR	D.Own	Mo	Spl	Tim	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
949	4.5	330	48.6	99-2000	99-2000	L	L	CC	7-3	11	CC	Ha	Zen	M	DR	DR	D.Own	Mo	Spl	Tim	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
1159	4.5	330	48.6	99-2000	99-2000	L	L	CC	7-3	11	CC	Ha	Zen	M	DR	DR	D.Own	Mo	Spl	Tim	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
1277	4.4	440	60.0	125-2000	125-2000	L	L	CC	7-3	12	CC	Ha	Zen	M	DR	DR	D.Own	Mo	Spl	Tim	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
1319	4.5	136	22.5	50-2600	50-2600	L	L	CC	7-3	7	PC	No	Str	P	DR	DR	P.BB	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
1421	5.1	141	21.0	60-2600	60-2600	L	L	CC	7-3	7	PC	No	Str	P	DR	DR	P.BB	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
1524	4.8	142	25.3	62-2800	62-2800	L	L	CC	7-3	8	PC	No	Str	P	DR	DR	P.BB	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
1624	4.8	142	25.3	62-2800	62-2800	L	L	CC	7-3	8	PC	No	Str	P	DR	DR	P.BB	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
1724	4.8	142	25.3	62-2800	62-2800	L	L	CC	7-3	8	PC	No	Str	P	DR	DR	P.BB	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
1824	4.8	142	25.3	62-2800	62-2800	L	L	CC	7-3	8	PC	No	Str	P	DR	DR	P.BB	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
1924	5.0	162	27.3	65-2800	65-2750	L	L	CC	7-3	9	CC	No	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
2029	5.0	193	33.8	85-2750	85-2750	L	L	CC	7-3	9	CC	No	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
2135	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
2232	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
2340	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
2434	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
2542	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
2640	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
2751	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
2856	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
2961	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
3066	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
3170	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
3274	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
3378	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
3482	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
3586	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
3690	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
3794	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
3898	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
3999	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
4099	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
4199	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
4299	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
4399	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
4499	4.6	224	36.2	90-2750	90-2750	L	L	CC	7-3	10	FP	Mo	Str	P	DR	DR	D.Fu	Fe	Spl	Sal	Ros	O2IMV	576	a	JX	172	108	34	48x3	54x3			
4599																																	



Line Number	MAKE AND MODEL	Wheels Driven—6-Wheelers	GENERAL (See Keynote)					TIRE SIZE		MAJOR UNITS						FRAME																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
			Tonnage Rating	Chassis Price	Standard Wheelbase	Max. W. B. Furnished	Gross Vehicle Weight	Chassis Wt. (Stripped)	Front	Rear	ENGINE		TRANSMISSION		REAR AXLE				Side Rail Dimensions	Type																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
											Make and Model	No. of Cylinders Bore and Stroke	Make and Model	Location and Forward Speeds	Aux. Location and Speeds	Make and Model	Gear and Type	Drive and Torque			Gear RATIOS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						

Line Number	ENGINE DETAILS										FUEL SYST.	ELEC-TRICAL	FRONT AXLE	BRAKES		BODY MOUNT-ING DATA		SPRINGS		Auxiliary Type												
	Piston Displacement	Compression Ratio	Torque lb. ft.	N.A.C.C. Rated H.P.	Max. Brake H.P. at R.P.M. Given	Valve Arrangement	Camshaft Drive	MAIN BEARINGS		Oiling System Type				Governor Make	Carburetors Make	Fuel Feed	Ignition System Make	Generator, Starter Make	Clutch Type and Make		Radiator Make	Universals Make	Make and Model	Steering Gear Make	SERVICE		Hand Type, Location	Cab to Rear of Frame	Cab to Rear Axle	Width of Frame	Front	Rear
								Piston Material	Piston Material																Number and Diameter	Length						
1	200	4.7	126	24.0	48-2500	L	C	A 3-2 1/2	5 1/2	CC	Mo	Zen	M	DR	DR	P. BB	Lo	Cle	Cla F212	Ge	L6IH	566	P	TX	123	64 1/4	34	38x2 1/4	40 1/2 x 2 1/4	N		
2	215	5.1	137	27.3	60-2600	L	C	A 3-2 1/2	9 1/2	CC	Mo	Zen	M	DR	DR	P. BB	Lo	Cle	Cla F212	Ge	L6IH	566	P	TX	118	63 3/4	34	38x2 1/4	40 1/2 x 2 1/4	N		
3	200	4.7	126	24.0	48-2500	L	C	A 3-2 1/2	5 1/2	CC	Mo	Zen	M	DR	DR	P. BB	Lo	Cle	Cla F212	Ge	L6IH	566	P	TX	123	64 1/4	34	38x2 1/4	40 1/2 x 2 1/4	N		
4	215	5.1	137	27.3	60-2600	L	C	A 3-2 1/2	9 1/2	CC	Mo	Zen	M	DR	DR	P. BB	Lo	Cle	Cla F212	Ge	L6IH	566	P	TX	118	63 3/4	34	38x2 1/4	40 1/2 x 2 1/4	N		
5	245	5.0	150	32.6	64-2600	L	C	A 3-2 1/2	10 1/2	CC	Mo	Zen	V	DR	DR	P. BB	Lo	Cle	Cla F304	Ros	L6IHV	675	a	TI	158	84	34	40x2 1/2	44x3	N		
6	288	4.6	181	32.6	73-2600	L	C	A 3-2 1/2	13 1/2	CC	Mo	Zen	M	DR	DR	P. BB	Lo	PS	Cla F304	Ros	L6IHV	675	a	TI	155	84	34	40x2 1/2	44x3	N		
7	288	4.6	181	32.6	73-2600	L	C	A 3-2 1/2	13 1/2	CC	Mo	Zen	M	DR	DR	P. BB	Lo	PS	Cla F304	Ros	L6IHV	675	a	TI	155	84	34	40x2 1/2	44x3	N		
8	339	4.2	212	38.4	80-2200	L	H	C	A 3-2 1/2	13 1/2	FP	KP	Zen	M	DR	DR	P. BB	Lo	PS	Own 7738	Ros	L6IHV	988	a	TI	182	102	34	42x2 1/2	50x3 1/2	N	
9	677	4.4	460	60.0	125-2000	L	H	C	A 4-3 1/2	11 1/2	PC	Wa	Zen	M	NE	NE	D. BL	Pe	Blo	Wls	Ros	B6IMV	504	G	TD	220	145	34	48x3 1/2	40x5	N	
10	462	4.5	300	45.9	102-2400	L	H	C	A 4-3 1/2	11 1/2	PC	Wa	Zen	M	R	NE	D. BL	Pe	Blo	Own M	Ros	B6IMV	541	G	TD	180	137	36	42x2 1/2	40x3	N	
11	331	4.4	420	34.7	94-2500	L	H	C	A 4-2 1/2	8 1/2	PC	Ha	Str	M	R	DR	D. BL	Lo	Cle	Own	Jac	BrIA	557	a	4M	161	100	34 1/2	40x3	51x4	N	
12	525	4.5	330	48.9	128-2100	H	C	A 7-3 1/2	14 1/2	FP	Wa	Str	M	DR	DR	D. OW	Lo	Spl	Own	Jac	B6IA	817	a	TX	161	100	34 1/2	50x3 1/2	45x4	N		
13	462	4.5	300	45.9	102-2400	L	H	C	A 4-3 1/2	11 1/2	FP	Wa	Str	M	DR	DR	D. OW	Lo	Spl	Tim 26450H	Ros	L6IH	774	a	CD	.....	.....	34	40x3	56x4	N	
14	420	4.5	230	45.0	135-3000	L	H	C	A 4-3 1/2	11 1/2	PC	Wa	Str	M	AL	AL	D. Fu	Ow	MM	Tim 27450W	Ros	B6IM	624	a	CD	.....	.....	34	40x3	58x4	N	
15	549	4.5	330	48.9	100-2000	L	H	C	A 4-3 1/2	11 1/2	PC	Wa	Str	M	AL	AL	D. Fu	Ow	MM	Tim 27450W	Ros	B6IM	624	a	CD	.....	.....	34	40x3	58x4	N	
16	677	4.4	460	60.0	125-2000	L	H	C	A 4-3 1/2	11 1/2	PC	Wa	Str	M	AL	AL	D. Fu	Ow	MM	Tim 27450W	Ros	B6IM	624	a	CD	.....	.....	34	40x3	58x4	N	
17	381	4.6	240	40.8	87-2500	L	H	C	A 4-3 1/2	12 1/2	PC	Wa	Zen	M	AL	AL	D. Fu	Ch	Blo	Cla F318	Ros	L4IHV	295	P	TX	Opt	Opt	34	40 1/4 x 3 1/2	31x3	N	
18	462	4.5	300	45.9	97-2000	L	H	C	A 4-3 1/2	13 1/2	PC	Wa	Zen	M	AL	AL	D. Fu	Ch	Blo	Tim 27450	Ros	L4IHV	504	G	TX	Opt	Opt	34	40 1/4 x 3 1/2	31x3 1/4	N	
19	462	4.5	300	45.9	97-2000	L	H	C	A 4-3 1/2	13 1/2	PC	Wa	Zen	M	AL	AL	D. BL	Ch	Blo	Tim 27450	Ros	L4IHV	504	G	TX	Opt	Opt	34	40 1/4 x 3 1/2	31x3 1/4	N	
20	677	4.4	460	60.0	125-2000	L	H	C	A 4-3 1/2	11 1/2	PC	Wa	Zen	M	AL	AL	D. BL	Ch	Blo	Tim 27450	Ros	W4IA	792	G	TX	Opt	Opt	36	43x3 1/2	66x4	N	
21	638	4.3	410	54.1	126-1850	L	H	C	A 4-3	10 1/2	PC	Pe	Zen	M	R	DR	dp. BL	Yo	Spl	Shu 715-11	Ros	W4IA	792	G	TX	Opt	Opt	38 1/2	41 1/4 x 3	53x4	N	
22	282	5.3	186	33.7	90-2500	L	H	C	A 7-2 1/2	10 1/2	CC	No	Str	M	AL	AL	P. BB	Yo	Spl	Tim 31020	Ros	L6IHV	559	G	TX	140	83	34	37x2 1/4	44x4	N	
23	282	5.3	186	33.7	90-2500	L	H	C	A 7-2 1/2	10 1/2	CC	No	Str	M	AL	AL	P. BB	Yo	Spl	Tim 8W75	Ros	L6IHV	459	G	TX	140	83	34	37x2 1/4	47x3	N	
24	428	4.4	283	45.9	94-2200	L	H	C	A 7-3	14	CC	Ha	Str	M	AL	AL	P. BL	Yo	Spl	Shu 5582B	Ros	L4IHV	625	G	CD	168	101	34 1/2	40x2 1/2	54x3	N	
25	428	4.4	283	45.9	94-2200	L	H	C	A 7-3	14	CC	Ha	Str	M	AL	AL	P. BL	Yo	Spl	Shu 5582B	Ros	L4IHV	625	G	CD	168	101	34 1/2	40x2 1/2	54x3	N	
26	453	4.7	300	48.9	98-2200	L	H	C	A 7-3	14	CC	Ha	Str	M	AL	AL	P. BL	Yo	Spl	Shu 5582B	Ros	W4IA	815	a	FD	.....	.....	33 1/2	42x3	56x4	N	
27	501	4.9	330	48.9	110-2200	L	H	C	A 7-3	14	CC	Ha	Zen	M	DR	DR	P. BL	Pe	Spl	Tim 36020N	Ros	W4IA	815	a	FD	.....	.....	33 1/2	42x3	56x4	N	
28	468	4.4	322	43.3	125-2400	H	C	A 4-2 1/2	10 1/2	CC	No	Zen	M	DR	DR	P. BL	Pe	Spl	Tim 36020N	Ros	W4IA	815	a	FD	.....	.....	33 1/2	42x3	56x4	N		
29	638	4.3	410	54.1	126-1850	L	H	C	A 4-3	10 1/2	CC	HS	Zen	M	DR	DR	P. BL	Pe	Spl	Tim 36020N	Ros	W4IA	815	a	FD	.....	.....	33 1/2	42x3	56x4	N	
30	707	4.4	506	60.0	170-2000	H	C	A 7-3 1/2	11 1/2	CC	FP	Bu	Zen	M	DR	DR	P. BL	Pe	Spl	Tim 36020N	Ros	W4IA	815	a	FD	.....	.....	33 1/2	42x3	56x4	N	
31	707	4.4	506	60.0	170-2000	H	C	A 7-3 1/2	11 1/2	CC	FP	Bu	Zen	M	DR	DR	P. BL	Pe	Spl	Tim 36020N	Ros	W4IA	815	a	FD	.....	.....	33 1/2	42x3	56x4	N	
32	411	4.2	236	40.0	89-2400	H	C	A 7-3	13	FP	No	Str	V	RR	DR	D. BL	Ow	Spl	Tim 16302	Ros	T4IA	848	G	TD	180	120	38	44x3	60x4	N		
33	427	4.2	267	45.9	100-2600	H	C	A 7-3	13	FP	No	Str	V	RR	DR	D. BL	Ow	Spl	Tim 16302	Ros	T4IA	848	G	TD	180	120	38	44x3	60x4	N		
34	638	4.3	410	54.1	126-1850	L	H	C	A 7-3	13 1/2	PC	No	Str	V	RR	DR	D. BL	Ow	Spl	Tim 17300	Ros	T4IA	848	G	TD	204	130	38	44x3	60x4	N	
35	754	5.1	510	76.7	240-2900	H	C	A 4-3 1/2	10	PC	No	Zen	M	DR	DR	dp. Lo	Ow	Blo	Tim 27450W	Ros	W6IA	966	a	CD	162	108	34	44x3	None	N		
36	420	4.5	230	45.0	135-3000	L	H	C	A 4-3 1/2	12 1/2	FP	Ha	Str	M	DR	DR	D. Fu	Ch	Spl	Tim 35000H	Ros	L6IHV	525	a	CD	162	108	34	39x2 1/4	46x3 1/2	N	
37	420	4.5	230	45.0	135-3000	L	H	C	A 4-3 1/2	12 1/2	FP	Ha	Str	M	DR	DR	D. Fu	Ch	Spl	Tim 35000H	Ros	L6IHV	525	a	CD	162	108	34	39x2 1/4	46x3 1/2	N	
38	462	4.5	300	45.9	98-2000	L	H	C	A 7-3	13 1/2	PC	Wa	Str	M	AL	DR	D. BL	Ch	Spl	Tim 26045W	Ros	W6IA	966	a	CD	162	108	34	48x3 1/2	53x4	N	
39	462	4.5	300	45.9	98-2000	L	H	C	A 7-3	13 1/2	PC	Wa	Str	M	AL	DR	D. BL	Ch	Spl	Tim 26045W	Ros	W6IA	966	a	CD	162	108	34	48x3 1/2	53x4	N	
40	549	4.5	330	48.9	100-2000	L	H	C	A 7-3	13 1/2	PC	Wa	Str	M	AL	DR	D. BL	Ch	Spl	Tim 27045W	Ros	W4IA	792	a	CD	162	108	34	48x3 1/2	53x4	N	
41	677	4.4	460	60.0	125-2000	L	H	C	A 4-3 1/2	11 1/2	PC	Ha	Zen	M	DR	DR	D. BL	Pe	Spl	Tim 26450W	Ros	W6IA	966	a	CD	162	108	34	48x3 1/2	53x4	N	
42	529	4.9	350	51.2	112-2000	L	H	C	A 7-3	14	PC	Ha	Zen	M	DR	DR	D. BL	Pe	Spl	Tim 26450W	Ros	W6IA	966	a	CD	162	108	34	48x3 1/2	53x4	N	
43	525	4.8	350	48.9	125-2300	L	H	C	A 4-3 1/2	11 1/2	PC	Wa	Zen	V	RR	LN	P. OW	Ow	Spl	Own AK	Ow	O6IA	760	a	FD	180	109	37 1/2	48x3 1/2	52x4	N	
44	525	4.8	350	48.9	125-2300	L	H	C	A 4-3 1/2	11 1/2	PC	Wa	Zen	V	RR	LN	P. OW	Ow	Cle	Own AK	Ow	O6IA	760	a	FD	180	109	37 1/2	48x3 1/2	52x4	N	
45	706	4.8	427	60.0	138-1900	L	H	C	A 4-3 1/2	11 1/2	PC	Wa	Zen	V	RR	LN	P. OW	Ow	Cle	Own AK	Ow	O6IA	760	a</								



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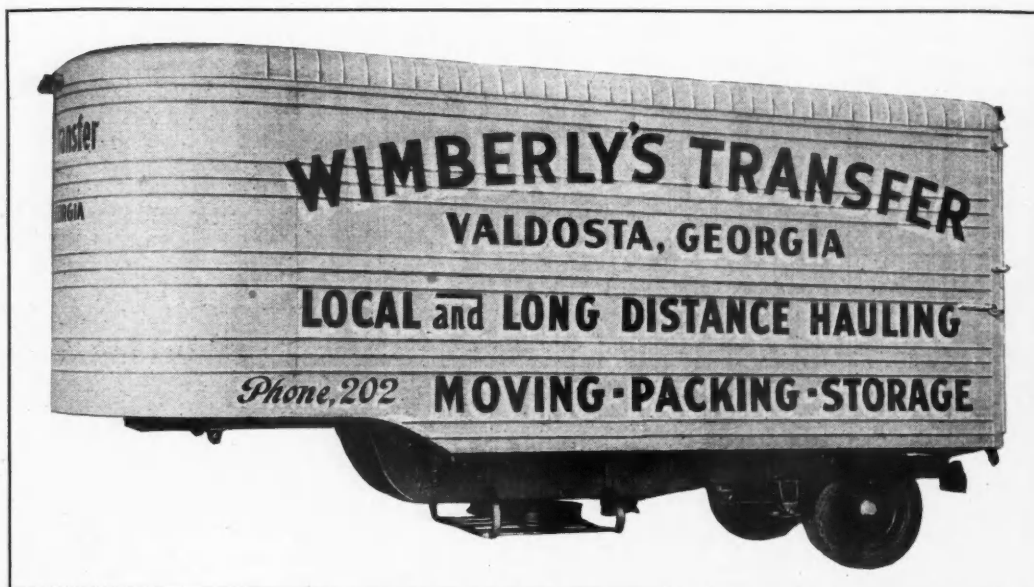
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